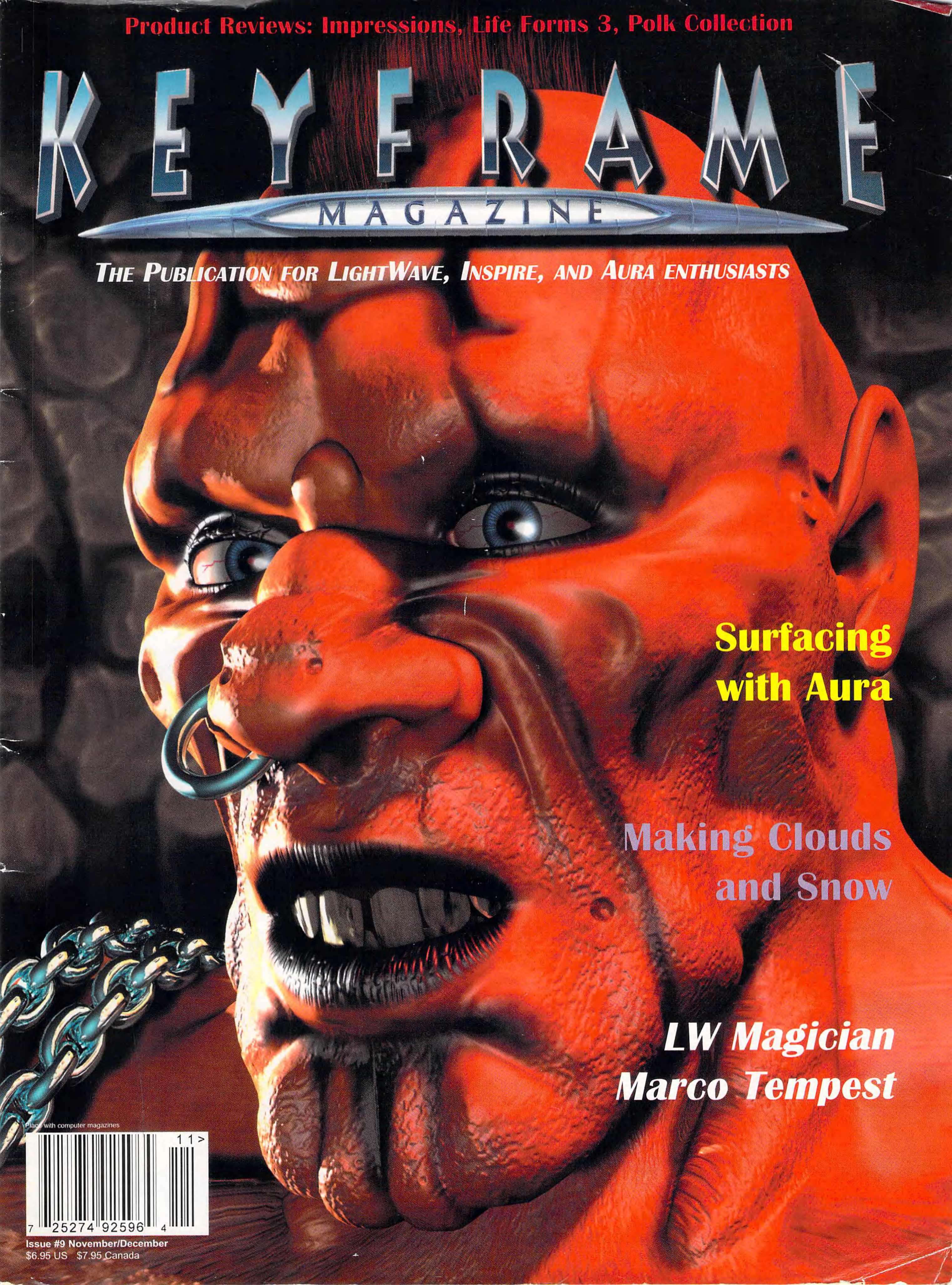
Product Reviews: Impressions, Life Forms 3, Polk Collection

KEYFRAME MAGAZINE

THE PUBLICATION FOR LIGHTWAVE, INSPIRE, AND AURA ENTHUSIASTS



Surfacing with Aura

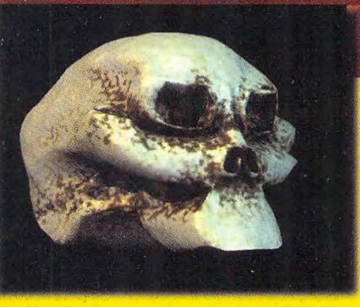
Making Clouds and Snow

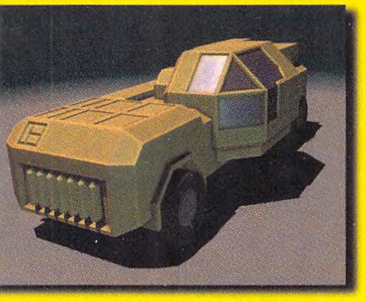
LW Magician Marco Tempest

Place with computer magazines

Issue #9 November/December
$6.95 US $7.95 Canada

AGC
Advanced Gradient Controller
GRIME





Here we go again, letting our pictures do all

Grime: Dirt is everywhere! It's unavoidable, and yet it is nowhere to be found in your scene. Your surfaces are too perfect; everything looks shiny and new. It's time to get down and dirty with Grime!

Grime tarnishes and dirties surfaces for that realistic "used" look. Apply the settings to the surface's Color, Luminosity, Diffuse, Specular, Transparency, Reflective, and Bump channels. You can even have it decay over a distance, and have cracks and crevices receive more dirt based on the crack angle.

So stop the perfection! It's time to get dirty with Grime.

AGC: Imagine surfacing an entire landscape, a flower petal, a colorful parrot, or anything with a color-shift, with just a few mouse clicks. Gradients have so many uses! Or they could, if they were easier to implement. Tweaking a bump-map for a gradient is so tedious and tricky, not to mention animating it! But now there's a better way: Advanced Gradient Controller (AGC).

Easily controlled by its powerful, intuitive interface, AGC allows you to create gradients with up to 8 colors. The convenient preview sphere shows you the gradient as you make adjustments. Apply the gradient to the surface's Color, Luminosity, Diffuse, Specular, Transparency, Mirror, and Bump channels, and set the opacity for each to mix it with other surfacing characteristics.

When you've got your gradient just right, create keyframes for it and have it change over time! Set these keyframes in each channel for perfect, amazing surfaces.

- Mystical Room (Grime and AGC) created by Eric Holbrook.
- Skull (Grime) created by Electric Crayon Studios.
- Truck (Grime) created by Adam Fijalkowski.
- Mountains (AGC) created by Eric Holbrook.

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The Cover Image: RedBull

This issue's cover was created by Sven Moll. He writes, "I used Lightwave 5.6 and PhotoShopLE to create the maps. The image is 100% Lightwave rendered and it was not retouched. The hairs were created with Two-Point-Polygons which were cloned with Point-Clone+. I made 14 images (-Color, -Diffuse, -Specular, -Transparency, -Bump and AlphaMaps) to map the character." You can contact Sven at *andreas.moll@munich.netsurf.de.*

Production
Keyframe Magazine is created on Intergraph machines using Quark 4.0, Photoshop 4.0, LightWave 5.6, Painter 5, and various plug-ins. Hardware includes a MusTek 2400 9600dpi scanner, Iomega Zip and Jaz drives, and a DPS Perception. The cover CD is created by David Warner using a GateWay2000 PPro200 w/128 mb Ram and an 18GB hard drive, a Truevision Bravado 1000 video capture card, Sony CD-Recorder, and an Iomega Zip drive. Software includes LightWave 5.6, Aura, Photoshop 4.0, Macromedia Director 6.5, Adobe Premiere 4.2, QuickTime 3Pro, and Adaptec Easy CD Creator.

A flea circus? You bet! Create special effects with the new Polk Collection of plug-ins, reviewed on page 46.

Tutorials

16 Character Shop by Doug Kelly
· Modeling characters using maquettes

28 Making Surfaces with Aura by Michael Ash
· Creating surfaces you can use in LightWave

32 5 Minute Miracle by Pat Beck
· Industrial Strength Arrows

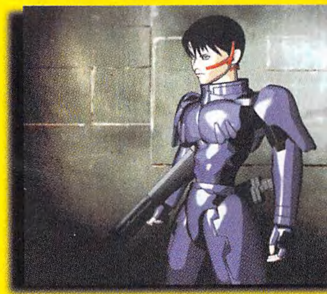
36 Making Clouds by Brenden Mecleary
· Creating cloud images

38 Let It Snow by Brad Herman
· Covering the ground with snow

41 Still Ssssmokin'... by Anupam Das
· Animating a smoke plume

RealiTools
VOL 2

the talking. (Apparently they majored in speech).

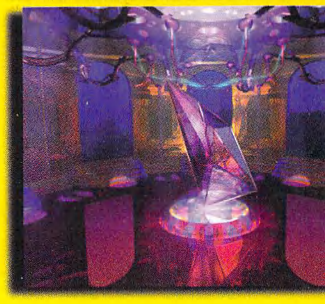


RealiTools Volume 2.0 is a second volume in the RealiTools set, bringing 10 new plug-ins to LightWave and Inspire.

High Tide: Turns a surface into a "fog" surface by increasing the transparency based on the proximity of the nearest surface behind it, respecting current transparency. Supports linear and exponential fading, and user-defined image maps for the depth of the fog.

Iridescence: Similar to LightWave's thin film shaders, but it supports fractal noise to break up the evenness of the iridescence effect and allows the user to modify the light wavelengths as desired.

Translucency: The companion to Soft Reflections in RealiTools volume 1! Blurs transmitted images, supports automatic, true fresnel effects, and drop-down lists for easy IOR selection.



Fresnel 2: Can be applied to all surface channels, with up to ten divisions on each channel. Has independent dissolve and envelopes for each division. Values and dissolves can be placed arbitrarily, and watch the changes in the real-time preview bar! Has sample preview sphere to see the final effect.

Lighter 2: Now supports eleven tags with up to three specular layers on each tag. Each layer can have its own custom color if desired, and you can scale the surface's specularity, allowing for texture mapping of specular values! Supports custom linear and exponential light falloff.

Also included: **Surface Envelopes, TimeBender, Distance, UnBlur,** and **FootLocker.**

Hey Internet Users! Use our new e-shop site to get your software immediately. Save time and money!

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EDITORIAL

Changing of the Guard

For those of you who did not read last issue's Editorial or catch the Internet announcements, it's official: I am the new editor of Keyframe Magazine. Patrik Beck will still contribute, but he has handed over the editorial reins. I would like to thank Patrik and the production staff at DMG Publishing for making this transition an easy one.

I have been working with 3D computer graphics since 1991, and writing about it almost that long. My writing has progressed from short news items to reviews to tutorials to complete manuals to third-party books, so the step up to editing Keyframe seems logical. I hope my experience and the skills I have developed will serve this publication well.

You won't see any drastic changes in this issue. I believe Keyframe is heading in the right direction, and my intention is to guide its evolution rather than incite a revolution. We want Keyframe to provide more tutorials for novice and advanced LightWave, Inspire and Aura users; enough timely, balanced product reviews and industry news to help you make well-informed decisions about your tools; and a showplace for the people and studios that push LightWave's limits.

One small change: because newsstands discard over half the magazines they receive, we are removing the cover CD from the newsstand version and reducing the newsstand price from $9.95 to $6.95. You can still get the CD-ROM directly from Keyframe, and CD-ROM subscribers will continue to receive their disc with the magazine.

Interesting Times

I think this is a great time to be in the CGI industry, especially with LightWave-compatible products. NewTek's Frame Factory announcement is one more in a series of industry mergers, acquisitions and product developments leading to vertical integration. The idea behind vertical integration is that a single company can produce tools for 3D modeling, rendering and animation, 2D paint and compositing, and on- or off-line editing - that is, the entire CGI process. The AVID/Softimage and Kinetix/Discreet Logic acquisitions are two recent examples. The main advantages to vertical integration are more effective marketing (for the vendor) and potentially seamless integration of tools (for the user). The greatest danger is that a vendor may opt for proprietary rather than open standards, in the mistaken belief that grabbing market share is more important than compatibility. This is a time when users have to speak out to keep vendors from bollixing up your toolbox. Keep those open standards!

This is also a time of maturing technology. Most of the CGI industry has agreed on the basic feature set. Differences now are more a matter of engine efficiency and interface design than of feature lists. Recent progress is measurable by incremental improvement rather than paradigm shift. Tools are generally more professional, capable, and intuitive. This is a good thing for users; you can concentrate on learning to use your tools more effectively, rather than deciphering the puzzles of your tools' inner workings.

Better tools enable beginners to easily perform work that previously required more talent, skill and experience. The bar has been raised - again. If you want to remain (or become) employed in CGI, you must continue to hone your skills and keep up on new tools and techniques.

I hope Keyframe Magazine can help you succeed.

Doug Kelly

RAME
ZINE

Issue #9 November/December 1998

Kidnap your own alien! Lee Stranahan tells the story on page 49.

Departments

4 **Editorial** by Doug Kelly
- Changing of the Guard

6 **Ear to the Wall**
- TVFX releases Art In Motion
- Magpie Pro
- DPS RT3DX
- TalkMaster from ComHertz, Inc.
- Making Maps with TrU-V
- QV 3.0
- HyperVoxels 2.0
- Impressions

10 **Profiles** by Tiffani Banaszak
- Making Magic with Marco Tempest

22 **Macintosh Up Close and Personal** by Jason Goodman
- Topic Round-up

24 **On Topic** by David Warner
- Answers to your LightWave Q & As

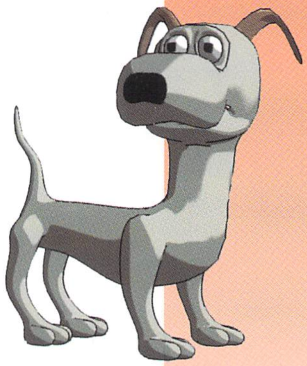
35 **Gallery Images**
- A look at LightWave art

43 **Cover CD Table of Contents**

44 **Reviews**
- Impressions
- Life Forms 3
- Polk Collection

49 **Take One** by Lee Stranahan
- The making of the Sector Expander commercial

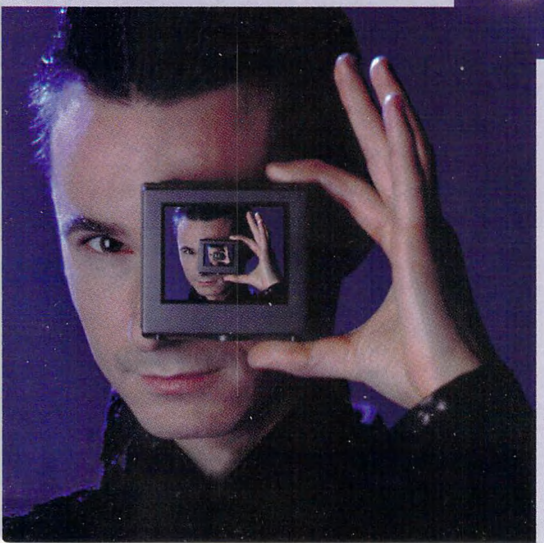
52 **Final Cut** by Rob Nederhorst
- Living Large



Virtual magic in LightWave! Meet Marco Tempest and his dog Jupiter on page 10.

DO YOU BELIEVE IN MAGIC?

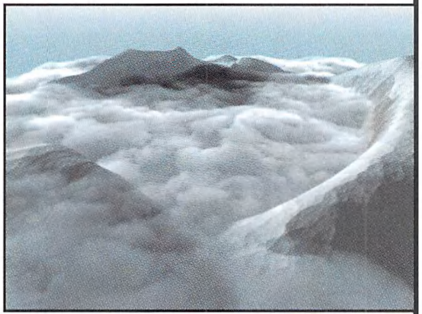
by Tiffani Banaszak



Magic. The word conjures up all sorts of images: disappearing elephants, quarters coming out of a child's ears, levitating women, card tricks, and even sawing people in half. Its history contains both the darkest depths of mankind's past and the opulence of king's courts. It uses smoke and mirrors, scantily clad women, contortionists, and sleight of hand. But with all of its tricks and twists, one question has yet to be asked: Does it use LightWave?

Getting Hyper

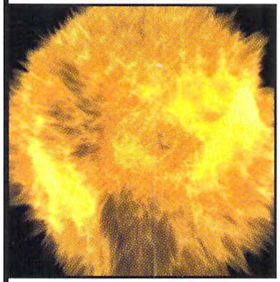
NewTek has announced HyperVoxels 2.0, the newest version of their breakthrough rendering technology that greatly simplifies the creation of highly sophisticated volumetric rendering effects.



HyperVoxels technology provides a geometry-efficient tool for LightWave 3D users that easily creates and renders organic effects such as fluids, smoke, pyroclastic effects, clouds, rocky surfaces, rusted materials, and other worldly phenomena. Previously, animators avoided creating these types of effects or used a laborious combination of morph targets, displacement maps and bones to create them.

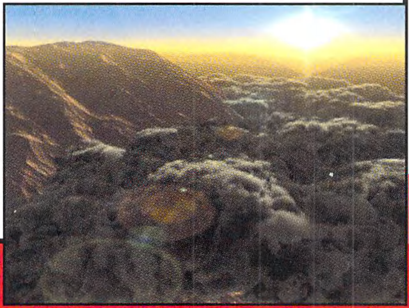
HyperVoxels 2.0's most significant new feature is a completely new internal Volumetric Rendering engine. Now animators have the technology to create impressive effects such as photoreal 3D clouds, volcanic ash, rocket contrails, thick smoke, and other natural phenomena. Because HyperVoxels renders the complete mass, users can create even more realistic animation by flying right into the volume of the effect.

Additional HyperVoxels 2.0 features include:
· Interactive viewing of controls over volumetric texture settings.
· Real-time animated previewing of volumetric textures in a 2D window.
· Multiple lighting models including Rayleigh, Beer, Constant, Diffuse, and Self.
· Customizable control of volumetric effects including volumetric shadows, render quality, and density.
· Smooth and multiple object blending between attributes and HyperTextures.
· Blending modes can be used to blend, affect or repel other objects.



· New smoothing modes can be used to tightly blend or loosen the distances between particles. Blending can also be turned off for discreet particle boundaries.
· More ultra-detailed sub-pixel HyperTextures have been added, allowing animators to create even more realistic effects in HyperVoxels 2.0.
· A new Bump-only mode allows users create simple, less render-intensive bump maps.
· New Presets selector includes a visual browser for quickly choosing the appropriate settings for your needs. Parameters can also be edited to customize surfaces.
· New Zoom mode can be used to examine details in any area of the render.
· An improved fractal algorithm removes repetitive patterns and improves render quality.
· Turbulence and Billowing effects give users more control over animated sequences.

Price and Availability
HyperVoxels 2.0 is available now for $249.00 (download version) or $269.00 (shipping version) directly from NewTek at http://www.newtek.com. HyperVoxels 2.0 runs with LightWave 3D 5.6, a free upgrade available for LightWave 5.5's registered users directly from NewTek's web site. LightWave 3D 5.6 runs on Windows NT and Windows 95, DEC Alphas running Windows NT, Power Macintoshes, Silicon Graphics and Sun Microsystems.

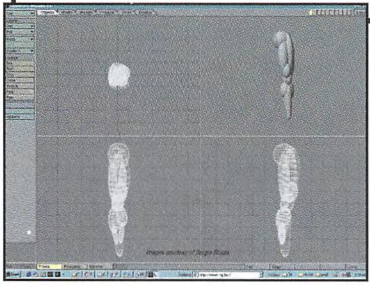


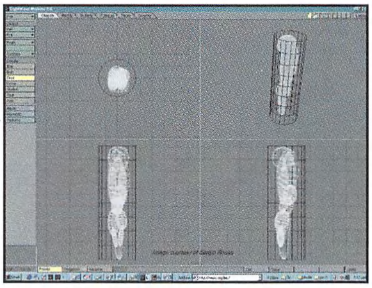
Making An Impression

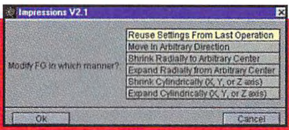
Impressions is a plug-in for LightWave's Modeler that provides a "deform to surface" capability. It can be used to quickly and easily create morph targets from dissimilar objects. It is also a useful tool for general purpose modeling. Version 2 is now available, adding cylindrical shrinkwraps and expansions. A downloadable trial version is on the Cover CD, and may also be found at http://www.ultranet.com/~dhudek/graphics/lw.

Impressions will take selected points in the active foreground layer and move them in a user-specified manner until they collide with the nearest polygon in the background layers (or if no collision, until they have reached the specified goal). The foreground object can be thought of as soft and flexible, with the background object forming a hard and unyielding surface over which the foreground object may be stretched or crushed.

Impressions is currently available for the Intel and SGI platforms. A port to the Alpha platform is planned.







Impressions V2.1

Modify FG in which manner?
- Reuse Settings From Last Operation
- Move In Arbitrary Direction
- Shrink Radially to Arbitrary Center
- Expand Radially from Arbitrary Center
- Shrink Cylindrically (X, Y, or Z axis)
- Expand Cylindrically (X, Y, or Z axis)

ing. Both MacInTouch and BugNet are advising users not to upgrade to OS 8.5 "until the problems are isolated and resolved." Another OS upgrade is the **Amiga OS 3.5**, which sports a redesigned interface, support for RTG and RTA cards, easy Internet connectivity, improved printing capabilities allowing the Amiga to interface with new printers, support for hard drives larger than 4GB, updated Arexx, HTML documentation, and PowerPC co-processor support. Requires CD-ROM drive, Hard drive, 68020 or higher processor, Amiga 3.1 ROMs and 4mb Fast RAM.

On October 12th, the House approved a measure passed by the Senate to improve **copyright protection in cyberspace**. The legislation utilizes two treaties passed by the UN World Intellectual Property Organization in 1996, restricting the intrusion of secured computers. The bill also lessens the liability of service providers for activities performed by their customers. There is an ongoing two year study period to examine how this new law will affect the current "fair use" laws, which permit personal use of copyrighted material.

And finally, networks are beginning to broadcast sports games and television shows in the new **HDTV** format. Slow to catch on with consumers, the $5000 sets are a luxury, especially since the only show other than a few sports programs that is being broadcast in HDTV is NBC's *The Tonight Show*.

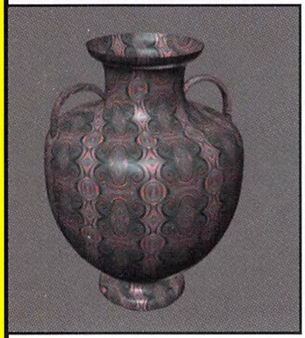
- compiled by Tiffani Banaszak

Ear to the Wall

Continued...

Map-Making

Positron Publishing Inc., has begun shipping the LightWave version of TrU-V (patent pending), a new 3D mapping technique for polygonal 3D models, that eliminates the stretching, pulling and other aberrations associated with traditional mapping techniques, thus saving animators time, effort and money.



TrU-V is a breakthrough 3D product because it automatically calculates custom U-V maps for 3D objects by analyzing the geometry of an object and creating a map with the unique U-V coordinate pattern necessary to match the shape of that object. TrU-V also includes a U-V coordinate editor so that animators can customize the appearance of their TrU-V map if desired. Once the TrU-V map is exactly as the animator desires, it may be exported by TrU-V into the supported animation application.

Compatibility and Pricing
TrU-V has been designed to maintain optimum compatibility with existing 3D animation and paint applications. Animators can use TrU-V with Positron's classic MeshPaint 3D as well as 3D paint packages from other vendors.

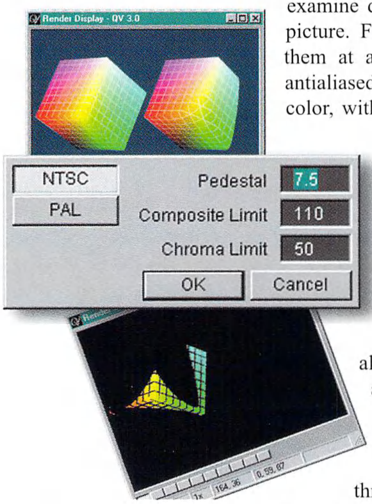
TrU-V also supports Kinetix' 3D Studio MAX R1/ R2 and a version supporting DEC Alpha workstations will follow shortly. Other applications will be supported as demand warrants. More information and a demo are available at Positron's Web site at http://www.3dgraphics.com. A free U-V shader will be posted on the Positron site soon.

For a limited time, Positron is offering TrU-V at an introductory price of $299. The suggested retail price of TrU-V is $500. A special discount is available to previous MeshPaint customers.

Render Display

Freelance software author Ernie Wright announces the availability of QV 3.0, a render display plug-in for Microsoft Windows versions of NewTek's LightWave 3D and Inspire 3D animation products. QV 2.0 is currently included with LightWave and Inspire.

New features include: Scroll around in images too large for the screen, zoom in to examine details, and zoom out to get the whole picture. Flip between test renders (up to 10 of them at a time) with a single keystroke. Add antialiased text in your choice of font, size and color, with or without a drop shadow. Drag the mouse to get a continuous readout of (x, y) and (r, g, b) for each pixel.

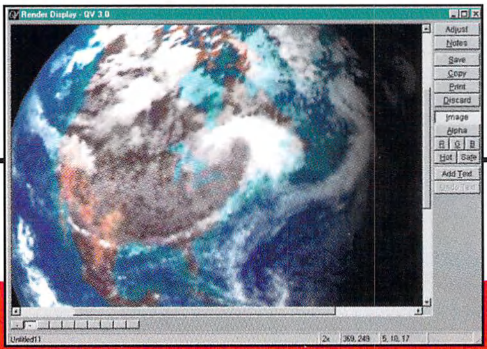


Pedestal 7.5
Composite Limit 110
Chroma Limit 50

As in previous versions, QV 3.0 is much faster than the default full-size window display it replaces. It is threaded, so you can return to work in Layout while the test image you just rendered remains on the screen. It also allows you to save the image (using any image format installed in Layout), copy it to the clipboard, or print it.

QV 3.0 is being made available through ShareIt!, an online software registration service with offices in Germany and the U.S. The price is $34.95, payable online by credit card, check, or wire transfer.

More information about QV 3.0, including screen shots and all of the documentation, is available at www.access.digex.net/~erniew/qv.html.



drives, the **14.1G** ($845), as well as a 10G ($715) and a 6.4G ($429). The drives will be replacement drives for IBM mobile hard drives found in Dell, Compaq, Gateway, and IBM's Thinkpad notebook computers. They will be available at PC makers in December.

Available now for PCs is the new **Service Pack 4**. According to Microsoft it will "improve the reliability of Windows NT, improve the infrastructure management capabilities, prepare for the Y2K conversion, and add Euro currency updates." It will also add networking enhancements and improvements to the security of servers. Speaking of **Y2K**, are you ready? To make sure, you could purchase several third-party programs that will replace the native time and date in your computer, making it assume all 00 dates are the year 2000 (although what will happen in the year 2100?). Visit http://vl1.zdnet.com/scripts/y2k.plx to check your computer's compliance. And seemingly futuristic, Danish scientists have created **Atomic Computer Chips**. Although not a practical solution now, the scientists anticipate the technology will become useful in the next few decades. Maybe they will help with the Y2-2100 conversion.

Some bad news for those who upgraded to the new **Mac OS 8.5**. Apparently, bugs found in the newest release of the Mac OS are deleting files and even entire hard drives! Other problems include MS Word 6.01a not working and folder icons gradually disappear-

It's All About Time. Real-time, That Is...

DIGITAL
PROCESSING SYSTEMS INC.

Digital Processing Systems Inc. announces its newest non-linear editing system, the DPS Perception RT3DX, a completely integrated real time non-linear editing system with real time 3D effects. At a suggested list price of US$8,995 (NTSC version, US$9,995 with SDI I/O option), it is the lowest cost real time 3D editing system on the market. By combining its standard-setting digital disk recorder hardware with DPS Video Action, (DPS' award-winning non-linear editing software), DPS brings the functionality of an integrated high-end editing system to the Windows NT platform.

With over 400 real time 2D and 3D digital video effects and transitions and the ability to create additional customized effects and transitions within Video Action, video editors will experience unparalleled creative freedom with the new DPS Perception RT3DX. "The Perception RT3DX offers something completely unavailable until now, a tightly-integrated, real-time, non-linear editing system, with real-time 3D effects, from a single manufacturer, for well under $10,000," commented DPS' Desktop Product Manager, Scott Bennett.

DPS Perception RT3DX includes: DPS Video Action NLE software, Version 6.2. DPS R3DX(tm) Real Time 3D Effects Board. DPS Perception RT Dual Stream Real Time Hardware with Component, S-Video, Composite & Stereo Audio I/O. DPS RBX2 Breakout Box for all Video and Audio Connections. Inscriber CG(tm) Real Time Character Generator Plug-in.

DPS Perception RT3DX Features: Instant manipulation of size, position, perspective and rotation of live video images. Warp effects include page curls, turns, splashes, random noise, spheres and horizontal/vertical sine waves. Component, S-Video, Composite and optional SDI video I/O. Real time scrubbing preview on both Video and VGA monitors. DVE supports five layers of real time video: two video streams, dual image buffers and a shadow/border generator. Real time scrolling/rolling titles with simultaneous transitions or additional graphic overlays. Field-based 4:2:2 broadcast quality effects. Over 200 pre-defined real time 3D DVE transitions and effects plus over 200 pre-defined real time 2D DVE transitions and effects. DVE totally integrated with the editing time-line. All effects are keyframable and infinitely customizable. Proc amp controls are keyframable on a per-clip basis. All effects can be applied as transitions or filters. Keyframable crop, freeze and strobe effects. Real time chroma and luminance keying. Trails, lighting, shadow and transparency effects. NTSC and PAL versions available. Contact DPS at www.dps.com or 800-775-3314.

The Waiting Is Over!
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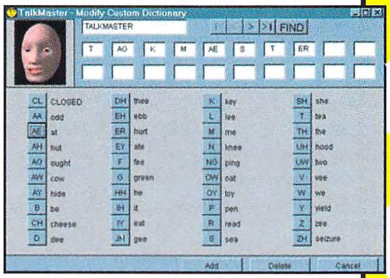
RT
VideoAction
REAL TIME DUAL STREAM
VIDEO EDITING
DPS

TALKMASTER™

ComHertz, Inc. recently announced that TalkMaster, a new software program designed to slash production time for Lightwave 3-D character dialog animators, is now available on its website at http://www.talkmaster.com.

TalkMaster is a plug-in which uses LightWave bones in the lips, jaw, and tongue to automate lip syncing and character dialog animation. It includes a facial bone template, which is applied to existing characters. Then you set the character to a mouth-closed position in Frame 0, and in frame 1 set a mouth-open position. TalkMaster uses this information to create a phoneme scene file; it's that simple! You then tweak these individual phoneme keyframes to your exact needs. In the last step, enter your character's text dialog and TalkMaster generates your entire dialog scene using the TalkMaster dictionary. You can even add your own syllables!



TALKMASTER

T AO K M AE S T ER

CL	CLOSED	DH	thee	K	key	SH	she
AA	odd	EH	ebb	L	lee	T	tea
AE	at	ER	hurt	M	me	TH	the
AH	hut	EY	ate	N	knee	UH	hood
AO	ought	F	fee	NG	ping	UW	two
AW	cow	G	green	OW	oat	V	vee
AY	hide	HH	he	OY	toy	W	we
B	be	IH	it	P	pen	Y	yield
CH	cheese	IY	eat	R	read	Z	zee
D	dee	JH	gee	S	sea	ZH	seizure

TalkMaster slashes dialog production times significantly. Using a single object with bones allows one team member to immediately begin animation with a rough version of the model while another team member completes the detailed object for final production. If your object needs more polygons--no problem. Just add them at any time by replacing the old object with the new. You can't do that easily with morph targets. No more long manual morph target creation and tweaking from exposure sheets. Give TalkMaster the text and in literally a matter of seconds you'll have your entire character's dialog keyframed into your scene file. TalkMaster does in seconds what used to take days. The time savings pays for TalkMaster the first time that you use it. TalkMaster is the next generation character speech animator.

TalkMaster Standard can be ordered directly from ComHertz, Inc. at www.talkmaster.com or by contacting info@talkmaster.com. Phone (305)569-9991.

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closed amount. Viewpoint will continue its operations as a division of CA. And **Advanstar Communications**, producers of the DCC Expo and publishers of *NewTekniques* magazine, just added Toronto's **Multimedia Trade Shows, Inc.** to their organization. Multimedia Trade Shows has produced the newMedia show and expo since 1984, which takes place in Toronto and this year drew over 200 exhibitors and 20,000 attendees.

Rumor has it that NewTek is drumming up financing for their new **PC Toaster**. Southwest Securities has been hired to raise $10 million for the development of the Toaster by issuing a private stock offering. Another piece of hardware, this one a reality, is **Frame Factory**. A streaming I/O board that includes Aura and LightWave, the Frame Factory is a single board solution that will also include audio support. The board and included software is priced under $4000. Call 1-800-847-6111 ((210) 370-8000 outside the US) or visit www.newtek.com for more information.

IBM has released several new hard drives, including a whopping **36.4G** (7200 RPM), and an 18.2G and a 9.1G that spin at 10,020 RPM and have 4MB memory caches. These drives are available in several formats, including Ultra2 SCSI Fast/Wide and Fibre Channel. The 36.4G is priced at $1575, $1350 for the 18.2G, and $850 for the 9.1G. Also available: three new **notebook hard**

Ear to the Wall

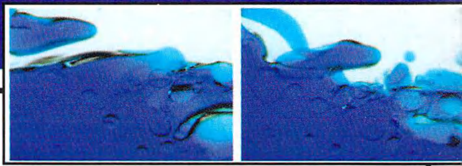
News from the LightWave arena

Set Your Animation in Motion!

TVFX, Inc. recently announced the December 1998 release of "Art in Motion", a groundbreaking six CD-ROM set of full-motion, D1 quality stock elements for professional desktop editors and designers.

The series includes:

Liquid FX: Liquid reactions including bubbles, underwater color bombs and liquid clouds.
Paint FX: Nearly 50 dynamic hand-painted film textures perfect for backgrounds and type fills.
Text FX: High-energy cycling graphic collages of type and textures.
Back Stage: A collection of dramatic images of the movie industry.
World Flags: Waving flags of the world's most newsworthy nations and political organizations.
Rush Hour: High-speed scenes of city traffic and crowds.

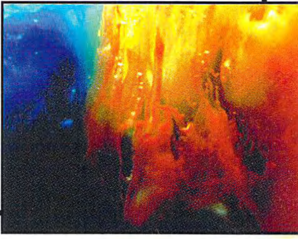


The FX titles are a collection of unconventional animation techniques and effects providing cutting-edge textures, background, and fills for editors and designers. The Art in Motion series also includes popular themes appropriate for use in advertising, news, corporate, web, or broadcast.

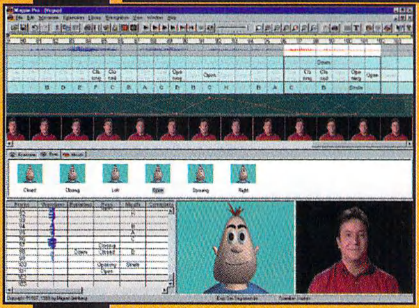
TVFX's Art in Motion series combines the highest quality technical and artistic standards. All elements are shot on 35mm motion picture film, transferred via the Spirit Datacine, and supplied as NTSC Quicktime movies for the Mac and the PC. All CDs feature the art direction of award-winning broadcast design firm Ozone, Inc., whose work is featured on CNN, USA Networks, the Sci-Fi Channel, and Cinemax.

The rights to TVFX's first four CDs, including bestselling Edit FX and Texture FX, were purchased by Adobe and recently acquired by EyeWire.

The Art in Motion series is now available as a six volume set for a special bundle price of $1250 (six CDs for the price of five), a three bundle set for $675 or individually for $250.

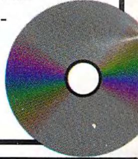


Contact TVFX at PO Box 743, Needham, MA 02494, call 781-449-9296, or call toll free 888-909-TVFX. For more information, visit www.tvfxinc.com.



Express Yourself

Magpie Pro is a powerful audio track reading utility. It has a number of tools for the professional animator that allow the creation of an exposure sheet for facial animation. It can be used to scrub the audio track and manually animate face movements, or it can analyze the audio using speech recognition techniques to automate the animation process. In both cases, it displays a real time animated preview that provides constant feedback and helps to correct sync errors before even starting the animation. The exposure sheet can be printed for use in drawn or stop-motion animation, or can be exported to a number of 3D packages for immediate use. Packages supported are LightWave 3D, 3D Studio Max, Softimage and Animation Master. More packages will be added in future versions. Available for Windows 95, Windows NT4 (Intel and DEC Alpha) and Power Macintosh for $250. Visit http://thirdwish.simplenet.com/ for more information.



BITS-N-BYTES

Beckett Entertainment recently completed the first part of a new three-part children's series entitled *Jingaroo.* Animated in LightWave, *Jingaroo* premiered Thursday, Nov. 19 at 6:30 pm at Dallas' Granada Movie Grill. Call 972-448-9148 for more information, or visit www.jingaroo.com. Doing some of the animation work on *Jingaroo*, as well as *Jimmy Neutron - Boy Genius,* is **DNA Productions**, a Dallas, TX based animation house and creators of last year's Christmas hit *Santa vs. The Snowman*. DNA recently sold an option on *Sheila, the Gila* to Dick Clark Productions, who will pitch the program to cable and television networks.

Mergers and buyouts seem to be happening left and right. **Westwood Studios** was recently purchased for $122.5 million by **Electronic Arts.** Known best for *Command and Conquer*, as well as *Lands of Lore* and *Dune*, Westwood Studios will now devote its energy to the EA SPORTS, ORIGIN, Bullfrog, Maxis, and Jane's Combat Simulations brands. **Viewpoint Data Labs**, distributors and creators of high-end 3D models (Viewpoint created the models for this summer's smash movie, *Godzilla*), were purchased by **Computer Associates International, Inc. (CA)** for an undis-

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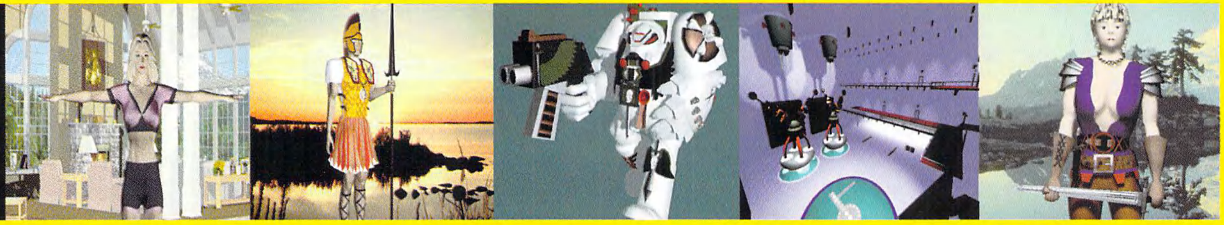
Aircraft by Loren Sharp

DinoDemo



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Reader Service #116

One magician has discovered yet another way of astounding audiences around the globe. His name is Marco Tempest, a wizard of the finest sort. His laboratory is in the Soho district of New York, where he works not with rabbits and mirrors but with LightWave and Digital Fusion. His assistants are trusty NT workstations, AVID MCXPRESS, and Discreet Logic's edit*. And his magic? Let's just say Marco has created his own dimension.

Capricious By Nature

Born in 1964 to a small family in Zurich, Switzerland, Marco Tempest began his career as a magician at the tender age of eight, amazing and delighting audiences all over Europe. He traveled during his summer vacations with the Swiss Children's Circus, a non-profit organization whose entire cast was comprised of children. His supportive parents believed in his dream and recognized his talents, allowing Marco to spend his free time entertaining crowds to help keep children off the streets and to make them better people.

Growing from a stage magician performing traditional magic to the spectacular showman he is now, Marco Tempest has won many awards for his unique presentations. As just a twelve year-old, Marco won his first award, First Place at the Swiss National Junior Magicians Contest. At age 22 he captured the prestigious World Cup of Magic, and in Paris in 1995 he won the magician's Oscar equivalent, the Golden Mandrake Award from the French Magician's Academy.

So what is it about Marco's show that has earned him these awards? Not only is it fast-paced and fun to watch, it is truly breathtaking. Imagine a man with six arms taking you into a world where you are mere inches tall, where flying logos and images of the future whiz by your head. A world where a car created with a cloud of flying fire-flies (500 lens flares combined with the Swarm plug-in) drives out of a computer monitor. Marco's world is a place where a skeleton has a mind of its own, and you are forced to use both sides of yours.

WYSIWYG, Or Is It?

Marco calls himself a "digital magician," and for good reason. Many of the elements in his act would not be possible without today's technology. Using several computers running LightWave and Digital Fusion, a Targa 2000 RTX3D, a Targa 2000 DTX, Discreet Logic's edit* and Avid MCXpress, he puts together all of the computerized elements in each show. Assisting him with the digital side of his magic is Pang Sie Piau, a freelance LightWave animator working out of Singapore. Pang Sie Piau is also creating the newest version of Marco Tempest: Virtual Marco, and his virtual dog Jupiter. (See sidebar, pages 12-13)

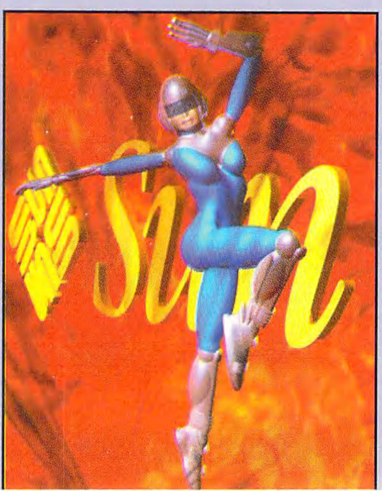
Some of Marco's performances include *Shrinker*, his most popular, in which he invites an audience member to experience the newest of technologies - Full Immersion Virtual Reality. The volunteer selects a virtual environment from a menu, and Marco escorts them "into" that environment...inside a Video Wall Display on stage. Once inside the environment, a technical glitch occurs, and the audience member winds up being frozen, then "shrunk" down to a 4 inch version of themselves. Marco takes the miniature person on the palm of his hand and walks back out on the stage and down into the audience with him. A video camera magnification shows the volunteer on Marco's hand as the two converse. Finally, he places the volunteer back into the video wall, and he or she is restored to their former size. The two of them exit the Virtual Environment and Video Wall together.

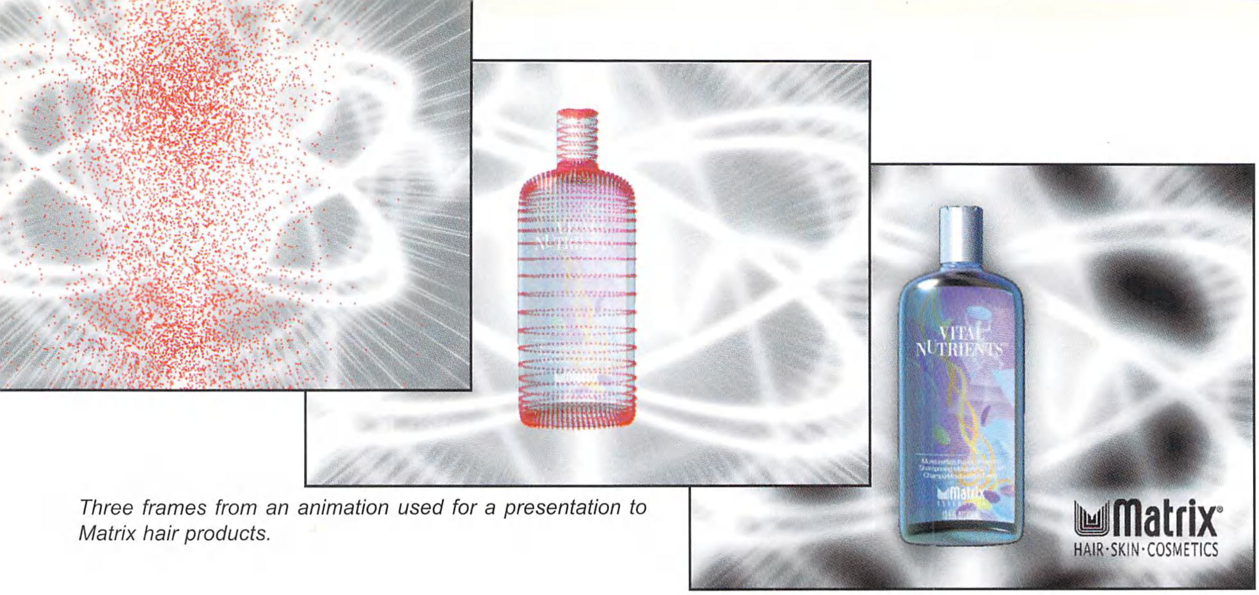
Other shows include: *Wings*, where Marco transforms a piece of paper into a bird; *Brain Man*, a mind-reading experiment with a twist; and *Magic Touch*, where hands inside the monitor play games with Marco, tossing objects into and out of the monitor.

With all of this interaction with video, Marco's timing and choreography must be absolutely perfect. Some of his acts involve him merely synchronizing his actions to the video. Other shows play the video from actual RAM, allowing him real-time access to the video through a special set of hidden triggers. He also uses real-time generated graphics where needed; in *Shrinker* he traces the outline of the volunteer from a blue screen, and 3D objects interact with it.

Dabbling in Magic

Marco started doing his "virtual magic" in 1991. Relying on industry support and sponsorships to see him through financially, he used Thompson Digital Image (TDI) and ElectroGIG for the 3D animations (Sun logo) on a SGI PI35, and composited his shots with





Three frames from an animation used for a presentation to Matrix hair products.

Parallax' Matador software. His first copy of LightWave was for his PC, and, accustomed to using software costing hundreds of thousands of dollars, he was amazed by the results.

"At that time in animation history it was a joke to even look at a piece of software without a five or six digit price tag. LightWave was far cheaper, and I think it provides the best renderer out there. It gives me extremely fast results with high-quality output, and the large user-base makes it relatively easy to outsource jobs," says Marco. Another advantage? "It is lean and mean and I can use it on my laptop while traveling."

Where in the World?

His initial corporate sponsors and clients included Sony, SGI, NeXT Computers, and others, but that list has grown to include AOL, Apple, IBM, Motorola, Lucent Technologies, Sears, Nissan, and Johnson & Johnson, to name a few. Creating custom shows for these companies to promote new products, Marco has appeared at SIGGRAPH, IBC, Cebit, COMDEX (this year for Panasonic) and CES (in January 1999 for Panasonic). His magic is in high demand all over the world, from Germany to Hawaii, Vegas to Orlando.

Because of its visual nature, people from many cultures and languages are able to understand and enjoy it. Giving upwards of 15 performances a day at larger shows, Marco's talent is becoming known very quickly. He even entertains guests at corporate meetings and gala events, but regardless of the type of presentation he is putting on, Marco never fails to enthrall his audience.

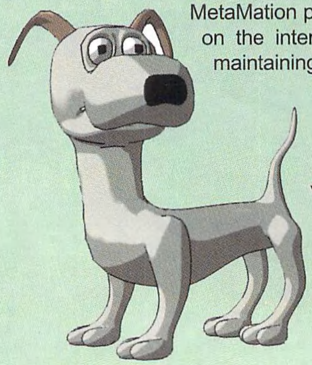
In reference to his custom shows, Marco says, "I regularly customize the video tracks that I perform to, inserting company logos and product images into my standard performance pieces. But I also design entirely new illusion pieces 'to order'."

Working with Marco to design these custom shows is an entire staff of freelance artists and technicians. Aside from animators Pang Sie Piau and Bob Eaton, he confers with Broadway consultant Charles Reynolds about his new presentations. There are also a large number of builders working for Marco, from machinists to prop builders and electronic engineers. Tobias Beckwith manages his show schedule, and there are many freelance agents and performers all over the world he regularly works with. As each project moves behind them, the team strengthens and grows.

Reinventing Yourself

What is the best way to be in two places at once? Have two of you! Marco Tempest, with the help of LightWave animator Pang Sie Piau, is creating his "new" self, Virtual Marco.

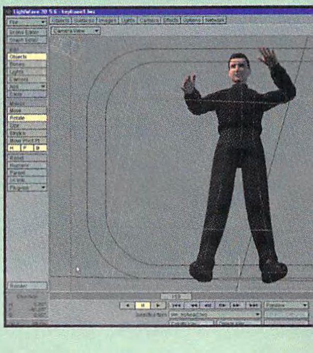
Modeled entirely in LightWave, Virtual Marco and his dog Jupiter were created with MetaNURBS. MetaNURBS was chosen because the resolution control it provides was necessary to achieve both high and low resolution models, and it is MetaMation compatible. Using MetaMation permits the polygon count to remain low on the interactive version of Virtual Marco while maintaining the high quality of the render.



Three versions of Virtual Marco were created: a seamless high-res version with bones, a segmented high-res version with object hierarchy, and a low-res real-time version with object hierarchy. The high-res version is useful for promotional graphics, while the real-time version will be used in live performances.

The creation process in LightWave was simple. Marco emailed several close-up photos of himself and his head to Pang Sie Piau, who used them to model the character in MetaNURBS. After much tweaking, the photos were manipulated in Photoshop to create texture maps, which were then mapped onto the model.

Marco Tempest requested two versions of Virtual Marco, a realistic rendering and a manga rendering. Manga is the Japanese comic-style of modeling, also known as anime, which is more cartoonish in likeness and does not require realism. Using LightWave's cell shader, Pang Sie Piau perfected the manga version of Virtual Marco. (There is an AVI clip of the manga version on the CD).



Do You Believe in Magic?

Preferring unconventional magic to the more traditional form we are used to seeing, Marco has had to learn many new things to perfect his act. Yet despite the wizardry of LightWave, he still relies on sleight of hand to accomplish many of his tricks. His dexterity was honed by his many years on stage performing "typical" magic, and comes into use in his performances now. Really, those birds/balls/cars don't appear out of nowhere! (Unfortunately, Marco wouldn't reveal his secrets without sending a hit-squad out for me, so you'll have to keep wondering!)

For Marco, CG is the direct extension of theatrical magic. "Interaction with technology has become a fundamental part of our daily lives. As an artist, I like to explore the possibilities of such interaction in a fun and entertaining way." He quotes Arthur C. Clarke, "Any sufficiently advanced technology is indistinguishable from magic."

At Home With Himself

A US resident for only three years, Marco has come to enjoy the American life. The Soho studio where he lives and works is at the meridian of cultures, where Soho, Little Italy, and Chinatown converge. This third-floor townhouse is also a convergence of sorts, bringing technology and traditional magic together. It has both a sound studio and a graphics studio, with video conferencing gear, wireless cameras and computers mingling with magic props and costumes.

> **"Tricks for a magician are like notes for a musician. It's what you do with them that sets you apart from other magicians."**

Spending five to ten days at a time, two to three times a month on the road takes its toll on Marco's social schedule, but it allows him to meet many new faces along the way and increase his prominence in the entertainment world. His American business is starting to intensify as US companies become more aware of his talents. His performance for Panasonic at COMDEX is sure to be an exciting one, and if you make it there, be sure to stop and catch his show!

The Magic Goes On and On and On...

Many animators are magicians in their own right, creating something out of nothing for viewers everywhere to gape at. Truly, Titanic is perhaps the finest example of digital wizardry yet, and I am on the edge of my chair waiting for the next piece of electronic divination to grace the silver screen. But Marco presents us with a new definition for "animation," just as he has redefined "magic."

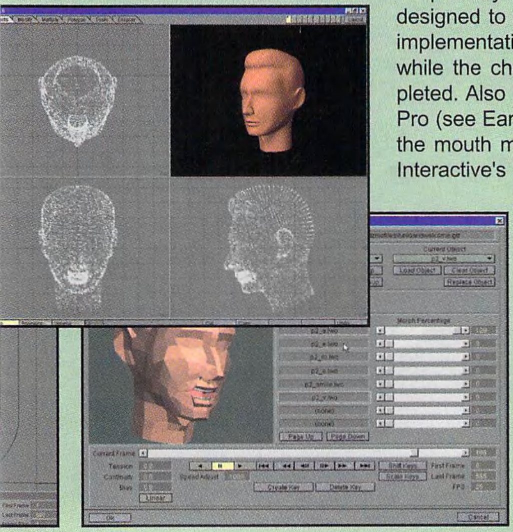
LightWave is the main ingredient in this techno-alchemist's lab, and he uses it like a magic wand, putting audiences under his mesmerizing spell. As Marco says, "Tricks for a magician are like notes for a musician. It's what you do with them that sets you apart from other magicians."

This philosophy can be applied to animators as well, who use the tools they have to set themselves and their creations apart from what other artists are doing. You have a whole hard-drive full of magical, mystical tools, and one of them is LightWave. What are you doing with it?

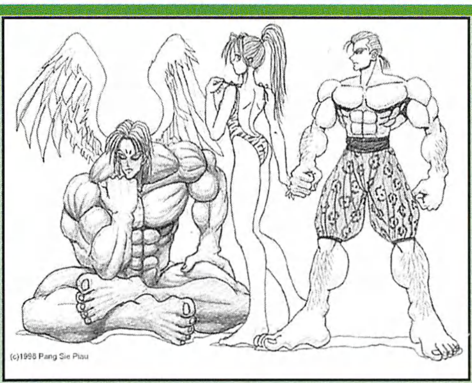
Visit Marco's web site for his tour schedule and more information: www.virtualmagician.com.

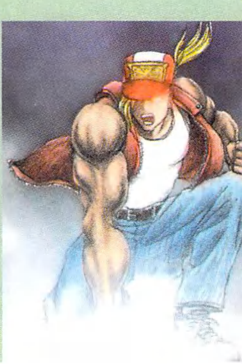
Tiffani Banaszak is the Marketing Director at Dynamic Realities. She can be reached at tiffani@dynamic-realities.com.

Making Virtual Marco talk, on the other hand, was a bit more difficult. The goal was to create a character that could interact in real time with a live audience. Therefore, Virtual Marco needed to have a wide range of syllables and gesture sets as morph targets available at the touch of a button.



Proprietary software is being designed to assist in the real-time implementation of Virtual Marco while the character is being completed. Also being used is Magpie Pro (see Ear to the Wall, page) for the mouth movements and Credo Interactive's Life Forms (reviewed in this issue, page 6) for the character's motions. Virtual Marco and his dog, Jupiter, will make their on-stage debut in January at a corporate event, in which the real Marco will appear to walk out of the monitors where Virtual Marco is being shown. By the summer of 1999, Virtual Marco will be a "real" entity involved in Marco Tempest's performances.





Pang Sie Piau, also known as Tomwoof, is a freelance artist, animator, and web designer. He has done interior design pre-visualization work for Davenport-Campbell, built real-time robot and aircraft models for Animated Objects, Inc. (www.ejets.com), and is currently working on a real-time web 3D for Oz Interactive (www.oz.com). He also has his own shareware model collection called Manga Babes. The image above and to the right were drawn by him. Visit his web site at home.pacific.net.sg/~siepiau.

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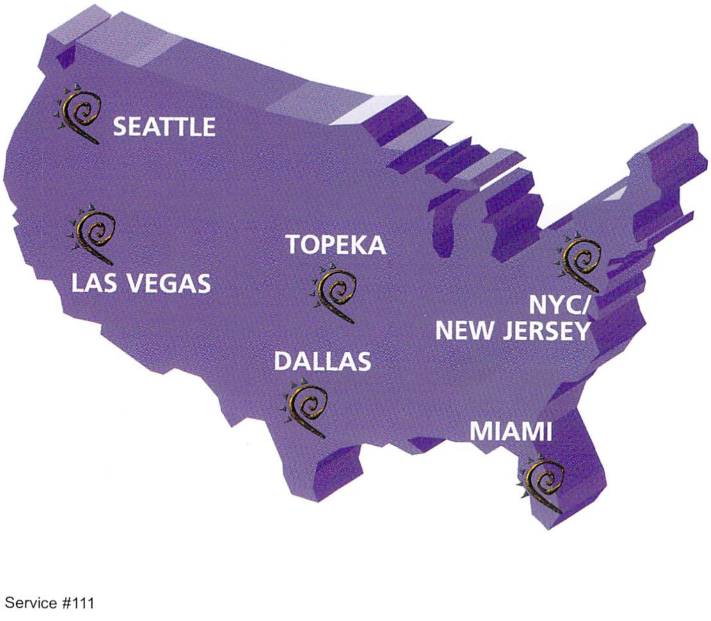
3D TRAINING

TAUGHT BY BOB ANDERSON

> "After attending the Dallas, Texas classes: LW 3D Essentials; Advanced LW 3D Techniques; Organic Modeling and Character Animation Essentials; and Intermediate Organic Modeling and Character Animation, I created this piece by using mainly Metanurbs and Polygon patching. I then designed a bone hierarchy allowing me to pose and even animate the aliens, a few lights, lens flares and VOILA! I thought I knew a lot about LightWave, but Bob's tremendous knowledge and style of teaching taught me so very much more which has turned me into an efficient and more productive modeler/animator."
>
> –Jonathan Gilbreath
> Houston, TX



Reader Service #111

Character Shop

with Doug Kelly

This issue's column, as promised, is a case study of modeling the head of the lead character, Fred, from my short film *Easy Come, Easy Go*. This process includes the tasks of drawing, sculpting, markup, imaging, digitizing, and model tweaking. Any character animation shop, from a one-person startup all the way to Digital Domain or ILM, might expect you to perform these same tasks. If your career goals include character animation, this process is indispensable for you to learn and practice.

The approach I am going to explain is brute force, spare-no-effort that some might consider overkill for many characters. I agree, when the character in question carries a minor role or is designed for real-time game or multimedia resolution or a simplified style. However, Fred is the lead character in an emotionally and physically demanding role that may someday (hey, I can dream, can't I?) end up on the big screen. Ergo, Fred gets the full treatment.

Not coincidentally, this approach also turns out to save the most effort in the long run. Remember those five criteria I keep harping on: reduce redundant work, support incremental detailing, provide rapid feedback, create documents for decision-makers, and stay flexible. The following character modeling process meets all five criteria.

Drawing

You can make your first rough sketches minimalist and dynamic to keep your creative impulses flowing. Use traditional artistic cheats and caricature techniques if you like. As you develop the character, you should firm up your drawings and make them less ambiguous. The model sheet, as described in last issue's column, should have enough detail to create a set of construction drawings. These final drawings should be as clear and precise as a blueprint, because that is exactly what they are. I strongly recommend that you make a set of orthographic projections, at least the front view and one profile, as in the left image in Figure A. Make drawings of the underlying skull as part of your final design sketches. In a larger production, these drawings are a signoff document for the producer, director and other decision-makers.

Flesh lies! Don't overlook the importance of designing a viable skull and skeleton. You should be able to visualize the underlying bone structure of your character. If you cannot clearly see the skull, you cannot clearly see where muscles should attach, where the jaw should hinge, and what should deform the final appearance of the skin. Begin at the beginning, and everything else will follow in logical progression. This is even more important when you are designing fantastic creatures. Attention to zoology and physiology pays off with greater perceived realism and fewer modeling, setup and animation problems. There are good, practical reasons that art schools teach anatomy along with life drawing!

Sculpting

A maquette is a three-dimensional physical model, usually constructed of clay, plaster or other easily worked material. The process of creating a maquette enables a solo artist or a design team to visualize, modify and detail the character in ways that 2D sketches cannot support. Modeling in clay requires truth that can be cheated or faked in 2D drawings. Details show up in 3D that are not obvious in 2D, like the undercut in a nasolabial furrow or the complexities of

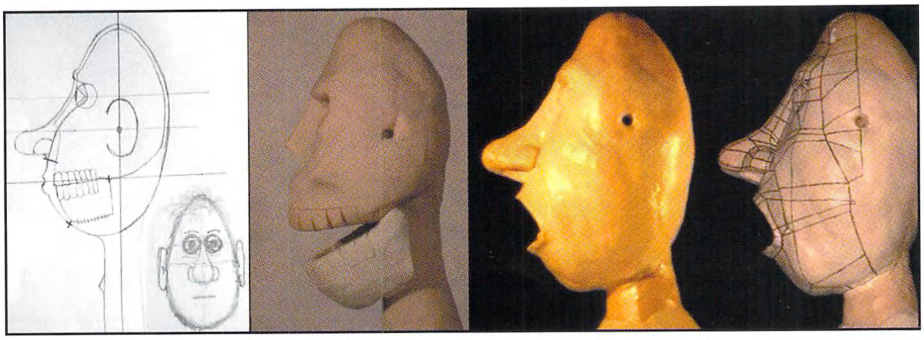


Figure A- Development of Fred's head from rough sketch and construction drawing with skull details (left) to marked maquette.

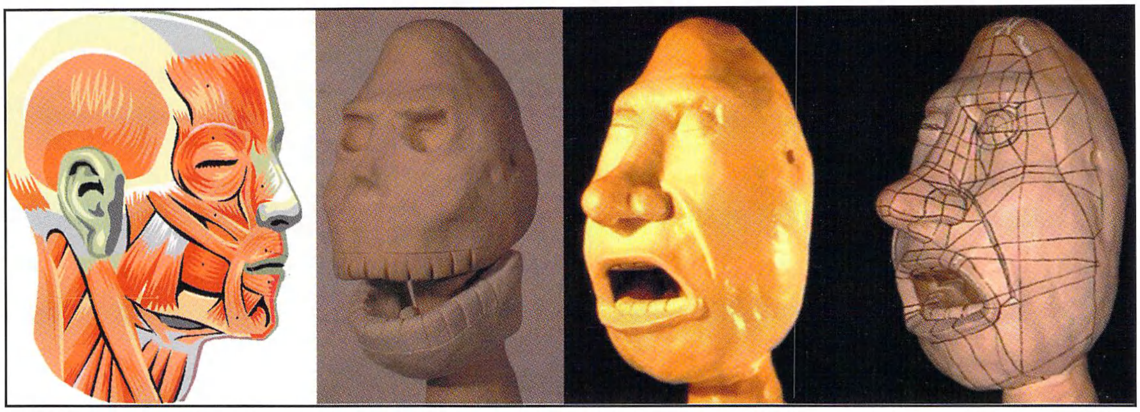


Figure B - Medical illustration of facial muscles (left) and three-quarter views of development of Fred's head from skull to marked maquette.

the inner corners of the eyes. Animation studios have used maquettes for many years, and computer animation has not changed that. In fact, maquettes have become even more important to CGI work, because 3D digitizers and scanners now provide a means of bringing the maquette directly into the computer. Maquette sculptors are a traditional and respected part of the design team at many studios, and those that do not have on-staff sculptors often hire freelancers.

As with drawings, maquettes meet the five criteria. Maquettes reduce redundant work by preventing miscommunication or misinterpretation. A 3D physical model is about the most effective communication tool you can show to a client, director or producer. Maquettes support incremental detailing by enabling you to modify them. Until you bake it, a Sculpey maquette remains flexible. After baking, you can add or remove bits, resculpting problem areas while preserving the remaining work. Maquettes provide (relatively) rapid feedback if you are a competent sculptor. If you have a supportive production team, you can even sculpt a rough maquette live in a design meeting. The finished and baked maquette is a document that your client, producer or director will approve. Getting a sign-off on a maquette is a major step in the production process, and the existence of that maquette can have an anchoring and inspiring effect on the whole team. Finally, maquettes enable you to stay flexible by giving you a safety net. If digitizing and modeling in LightWave fails, you can return to the maquette as the last successful stage in development and repeat the modeling process from there.

When your construction drawings are ready, I recommend you actually model the bone structure of your character first, as shown in the second image of Figures A and B. Later, you can lay sculpting material over the skull to mimic layers of muscle, fat and skin. This might seem tedious, but it is the surest way for a beginner to avoid major modeling errors. A skull is much easier to model than an animatable human face, but it has subtleties you might overlook if you skipped straight to modeling the surface appearance. The most critical features are the orbits of the eyes, the points of the cheekbones, the hinge of the jaw and the lines of upper and lower teeth. If you model all these correctly, the overlay of muscle, fat and skin will follow more easily and logically. This approach also gives you a stronger idea of how the finished model should move: each line of muscle is a line of tension between the attached skin and bone. With practice, you may be able to dispense with modeling the skull, but I still recommend and use it.

Go back to the source! I do not recommend studying art and drawing books except as general background. When you are looking for study models for muscle and bone, study muscle and bone. Buy an inexpensive (but accurate) plastic model human skull. Buy or borrow an anatomy text that is illustrated with photographs, not drawings. Find an actor or actress with prominent facial musculature, and study clips of their close-ups. I chose Kent Broadhurst because of his facial muscle definition and because I have a laserdisk of Silver Bullet, in which he has a series of intense emotional close-ups. These clips also provide good material for lip sync tests. With practice, you will be able to choose a model similar to your character.

Broadhurst looks nothing like Fred, but I needed to study his muscle definition. Human actors closer to Fred in appearance generally have thicker layers of fat over the muscles of the mouth and jaw, which makes them harder to study. For example, the medical drawings I referred to for muscle names and attachments were fine as far as they go (Figure B, left). However, they leave out surface interactions like the nasolabial folds, which run from just above the nostrils to the edges of the mouth sphincter near the corners. Without close study of a live-action actor, I would not have known where to place this fold and how it changes as the underlying muscles move. Look at the next half-dozen CGI characters you see, and note how many of them are missing this feature. Its absence leaves the face looking flat, plastic and overly simplified.

Speaking of oversimplification, you should resist the urge to model half a character and simply Mirror it. Asymmetry is a human characteristic. More asymmetry is generally perceived as uglier, while less is conventionally pretty. Perfect symmetry looks inhuman, but only slightly imperfect symmetry makes a fashion model. Fred is definitely not a fashion model. As you may have gathered from the script and storyboard, I have no intention of allowing Fred to become a sympathetic character. To this end, I sculpted Fred to be markedly asymmetric. While not quite Quasimodo, he will not win any beauty contests.

I prefer sculpting maquettes in Sculpey, a family of synthetic clays that can be molded like ordinary clay, then fired at relatively low temperatures to harden them. Fired Sculpey maquettes are lightweight and durable, and can take paints and other finishes. The original Sculpey is plain white and has a slightly crumbly texture. You can buy it in most art, ceramic, or craft stores. If you cannot find a local supplier, you can call the manufacturer, Polyform Products, at 847-427-0020 for more information or the address of the nearest distributor.

To fire Sculpey, put it in a temperature-controlled oven at 250 to 275 degrees Fahrenheit for 15 to 20 minutes per quarter-inch of thickness. If you plan to fire a lot of maquettes, think about buying an inexpensive toaster oven that you can use exclusively for firing clay. If you overheat Sculpey, it can give off toxic fumes and leave a nasty residue, both on the inside of the oven and on any dishes you used to hold the maquette. Do not use a microwave -- the maquette will explode!

Firing time and temperature will depend on the thickness of the Sculpey. Thicker layers take longer and should be fired at lower temperatures to avoid cracking due to uneven heating. On the other hand, if you leave thin spots in the Sculpey, they can scorch and burn. If parts of your maquette will be very thick, you should consider layering the Sculpey over an armature. The armature can be wads of aluminum foil, bent coat hanger wire, or anything else that will not melt or distort during firing. A good armature helps hold the maquette together, lowers total weight, and saves clay that would otherwise be wasted on interior volumes. I modeled Fred's head around a core of crumpled heavy-duty aluminum foil, and packed the lower end of the foil into a wide tin can as a temporary base.

If any part of your maquette is hollow, you need to leave passages for air to escape during firing. Trapped air will expand when heated, blowing your maquette apart. This is also a good reason to thoroughly knead the clay before modeling the maquette and make sure you press out all the air bubbles. Make sure the Sculpey is not overage, either. Check the dates on the side of the box. If you get a bad or overage batch by mistake, contact your distributor or Polyform Products for a replacement.

"A patient spouse is a definite asset to this business!"

Once you have fired the Sculpey, you need to cool it down carefully. If you cool it too rapidly, your maquette will crack. You can prevent this by leaving the maquette in the oven with the heat turned off and the door open, so the maquette cools at the same rate as the oven. You can also remove the maquette from the oven and immediately wrap it in one or more thick towels, which will insulate it and allow it to cool more slowly and evenly. This is what I prefer to do, since it gets me (and my smelly sculptures) out of the kitchen more quickly. A patient spouse is a definite asset to this business!

Once the maquette has cooled completely, inspect it for scorches, burns, and cracks. You can repair Sculpey by cutting off the bad part, smoothing on a new layer and re-firing. You can sand off small burns with a nail file or emery board. The fired maquettes sometimes do not hold up well over time, cracking in spots and crumbling around the edges. You can make your maquette last longer by coating it with sanding sealer or clear nail polish, which will reduce dusting and crumbling problems. Make sure the finish you apply to your baked maquette can take dry-erase markers or colored pencil without leaving a permanent mark. You will be experimenting with your first digitizing mesh, so you need to be able to erase your marks cleanly. I first used Sculpey Glaze #33 Matte, which turned out to be a mistake. It is a little porous, so if you leave marks on it too long, you can't erase them. It's a good thing that whiteout works on this stuff, too! Whatever you use, test the sealer and markers in a harmless spot first.

The first fired stage for Fred's maquette is the bare skull, as shown in Figures A and B and in the SkulGrey.AVI clip on the CD-ROM. This maquette clearly shows such major reference points as the cheekbones, upper teeth, bridge of nose, eye orbits, jaw hinge and ear holes. From these reference points, it is straightforward and logical to apply more clay as muscle and skin according to the model sheet and any appropriate medical references.

At this point, you need to select a facial expression or pose for the finished maquette. The expression I selected is odd, not one you are likely to encounter in real life. However, this pose has the significant advantage of exposing as much unfolded and unwrinkled skin as possible. The lips are drawn wide and down, enabling me to model a default smooth lip surface rather than wrinkles. The lips are also everted, or turned out, which is easier to model smoothly than a compressed pose. The nasolabial fold or furrow is not completely flattened, but also not exaggerated to the point of compressing the cheek upward to occlude the skin around the eye. The eyelids are closed, but not tightly compressed. The jaw is lowered to stretch the cheeks flat, but not gaping so much that the lips and cheeks are overstretched. The eyebrows are relaxed. This is a good compromise for a neutral modeling pose. This is not going to be the neutral animation pose, but that discussion is for the next column.

I referred to the medical illustration in Figure B to find the approximate order, attachment points and layering of the facial muscles. I rolled out thin layers of Sculpey, cut approximate shapes for the facial muscles, then applied them, in order, to the fired skull. After I placed all the muscle layers, I added thin bits of Sculpey and smoothed out all the layers to create the completed head. You can see a 360-degree view of the maquette in file Maquette.AVI on this issue's CD-ROM. The advantage to doing all this modeling on top of the fired skull is that you can peel off your mistakes without damaging the skull. I did this twice until I was satisfied with the results. If I had modeled the entire head from scratch, I would have taken about three times as long to finish the maquette. It probably would not have turned out as well, either.

Once you are satisfied with the complete maquette, fire it to harden the face and head. Since I was using a temporary base of aluminum foil, the head was not perfectly stable. After firing the head, I modeled a thick layer of Sculpey around the base of the maquette's neck to create a rigid base. After firing the maquette a third time, I had a solid, durable maquette with a wide, solid and flat-bottomed base. I am pretty happy with the way it turned out.

Markup

The next task is to lay out the grid for digitizing and animating the model. The goal is to cover the maquette with a net of four-sided polygons, using no more than are absolutely necessary. Every extra point can become an albatross around your neck for the rest of the project. When you are building the setup, you have to treat each point as an animation control -- whether you want it to be or not!

The goal for this markup is not to place a point at each contour change. The goal is to lay out a MetaForm cage that you can tweak in Modeler and Layout to create a close copy of the maquette. You will not be able to make a perfect duplicate, because MetaForm does not work that way. However, you will be able to animate with a much lighter model with less work and a good level of control.

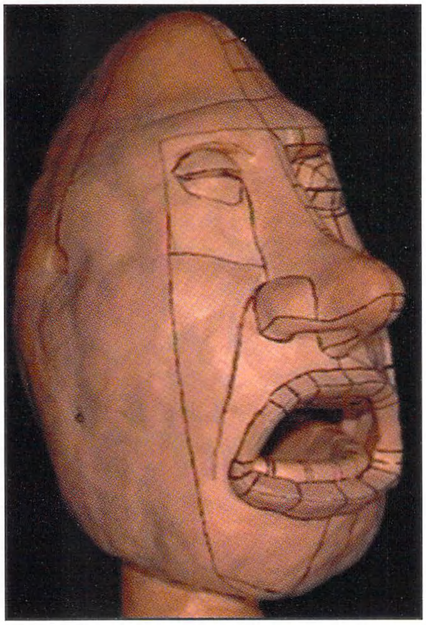


Figure C - Major contour lines marked.

Think about this! Take your time. Experiment. Use a fine-point pen or pencil so your marks are as precise as possible. Mark the major contour lines first, as in Figure C. These are the lines from which all other polygons will expand. These are also the major lines you will use to animate the face of your character. These lines should mark where the face changes direction, where the influence of one muscle group gives over to another. As a general rule, it is a good idea to bisect the entire head with a contour line. Even with an asymmetric character like Fred, you can save a lot of effort with a Mirror operation. For Fred here, the remaining major lines are the nasolabial fold, the line across the top of the cheekbone, the line from eyebrow to chin, and most importantly, the lines following the sphincters around the eyes and mouth. These last two areas are the most critical for your character's acting ability. You can pull an Oscar-winning performance out of an animated beach ball, as long as it has expressive eyes and mouth.

Once you have the major contour lines marked, start filling in between them with four-sided polygons. If you are working with a reasonably complex maquette, you will have to solve some interesting problems. Look at the images in Figures A, B and C to see some of my solutions to problem areas like the eye corners and changing the number of polygons along a contour line. Trapezoids, anyone?

Do not get discouraged if you cannot lay out a perfect grid on your first (or tenth!) try. This is the kind of three-dimensional spatial relations puzzle that I love to solve, yet I still ended up with whiteout in half a dozen areas of my maquette. This is a learning process; you will get better at it the more you practice. Also, markup is like drawing or sculpting as part of the production process. If you make mistakes, it is much cheaper to fix them now than during final rendering. Think incremental detailing; do the markup one careful step at a time. Your maquette markup can be another document that the decision-makers can approve. If you get stuck, show your markup around. Other production team members may be able to offer constructive criticism.

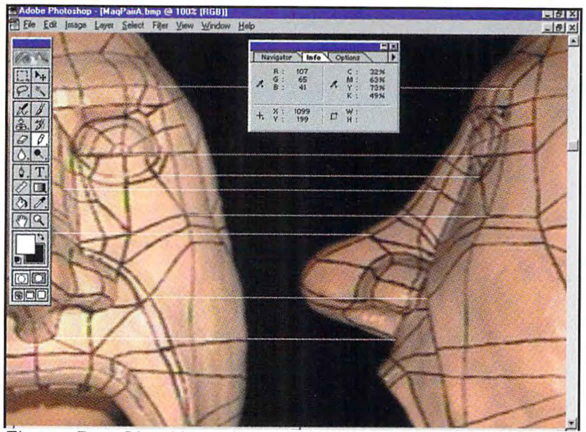
If you have access to a digitizer like Immersion's MicroScribe 3D, you can skip to the last section of this column. Just follow the directions for your digitizer, and capture the grid you have marked on the maquette. If you do not have access to a digitizer, the next section will show you how to do it the old-fashioned way.

Imaging

When you think your markup is ready, the next step is to capture images to feed into LightWave's Modeler. The basic idea is to line up points in the model with the grid drawn on the maquette in the backdrop images. The more images you use, the more checks you can make to confirm the placement of each point. Unfortunately, every extra image also adds the possibility of error, so you can easily find yourself noodling back and forth between two mutually exclusive errors for the same point. In general, you should use the minimum number of images you need to cover the subject. For human faces, I recommend four shots as the minimum: 180 degree face-on, 90 and 270 degree profiles (either side), and 135 and 225 degree three-quarter views. For a full head, you will need 0, 45 and 315 as well.

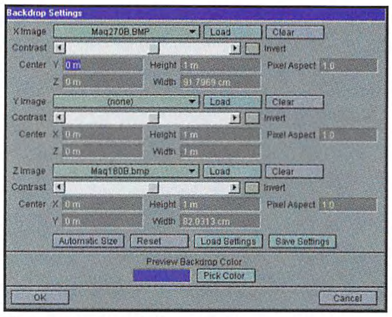
These basic shots should be taken with the camera level at the middle of the subject's height, with as long a lens as possible. Keeping the camera level allows you to ignore the lateral axes, so, in modeling, you will only have to rotate the model on the vertical axis to match the angle of the background image. Using a long lens minimizes distortion due to perspective. The farther away the camera is from the subject, the flatter and more accurate the image will be.

There are a variety of ways to get images into your computer. Low-cost solutions like a Snappy or video capture card are one possibility. For these images, I used an ATI All-In-Wonder video card to capture 1024x768 (oversampled) images from a Hi8 camcorder. For best results, I recommend using a good 35mm camera and having the film developed onto Kodak PhotoCD. Other methods of image capture or scanning generally have lower resolution, and you want these images to be as sharp as pos-


Adobe Photoshop - [MaqPairA.bmp @ 100% (RGB)]
File Edit Image Layer Select Filter View Window Help
Navigator
Info
Options

R : 107
G : 65
B : 41
C : 32%
M : 63%
Y : 73%
K : 49%
X : 1099
Y : 199
W :
H :

Figure D - Checking alignment of maquette images using Photoshop.


Backdrop Settings

X Image: Maq270B.BMP
Center Y: 0 m; Z: 0 m
Height: 1 m; Width: 91.7969 cm
Pixel Aspect: 1.0

Y Image: (none)
Center X: 0 m; Z: 0 m
Height: 1 m; Width: 1 m
Pixel Aspect: 1.0

Z Image: Maq180B.bmp
Center X: 0 m; Y: 0 m
Height: 1 m; Width: 82.0313 cm
Pixel Aspect: 1.0

Load
Clear
Contrast
Invert
Automatic Size
Reset
Load Settings
Save Settings
Preview Backdrop Color
Pick Color
OK
Cancel

Figure E - Backdrop Settings Panel

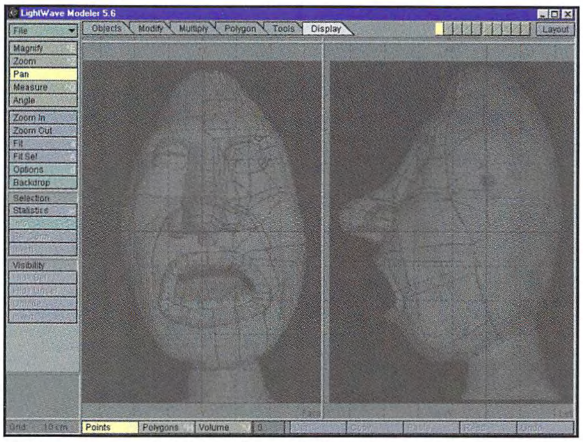
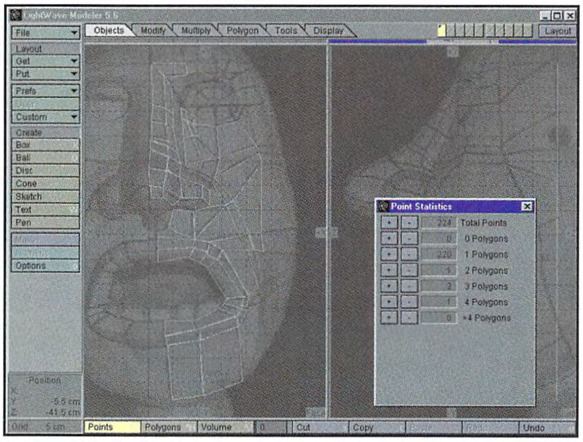

LightWave Modeler 5.6
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Magnify
Zoom
Pan
Measure
Angle
Zoom In
Zoom Out
Fit
Fit Sel
Options
Backdrop
Selection
Statistics
Visibility
Points
Polygons
Volume

Figure F - Profile (Maq270B.bmp) and front face (Maq180B.bmp) images loaded as backdrops.


LightWave Modeler 5.6
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Get
Put
Prefs
Custom
Create
Box
Ball
Disc
Cone
Sketch
Text
Pen
Options
Position
Points
Polygons
Volume
Cut
Copy
Undo
Point Statistics

224 Total Points
0 0 Polygons
220 1 Polygons
1 2 Polygons
2 3 Polygons
1 4 Polygons
0 >4 Polygons

Figure G - New four-sided polygons Penned, Merged and Welded to match Maq180B.bmp backdrop.

sible. The limit of your modeling accuracy is directly proportional to the quality of the reference images.

To get accurate results, you need to register the maquette's base at 45-degree intervals. If you only capture images at 90-degree intervals, you will inevitably find a few points that are simply not visible. You will have far fewer fugitive points if you have a 45-degree series of images. I found it easiest to print a set of four straight lines intersecting at 45 degrees on a piece of paper (picture an X superimposed over a plus sign). I then taped this guide to the surface of my photo stand. I centered the maquette on the paper, then marked on the maquette's base each of the eight points where the lines emerged. With these reference points, I was able to precisely realign the maquette at 45-degree increments for a complete set of reference images. The CharShop directory on this issue's CD-ROM has a selection of five images from the Fred maquette: Maq315, Maq270B, Maq225, Maq180B, and Maq135B. If the maquette has hidden undercuts, you will also need to capture tilted poses.

If you will be sharing the maquette among members of a production team, it is a good idea to make a maquette reference AVI that you can distribute. Start with the maquette facing away from the camera. Rotate the maquette counterclockwise through 360 degrees as you grab frames. Assemble the images, in order, into an AVI. With this capture sequence, dragging the scrub bar in an AVI player creates visual feedback as intuitive as rotating the physical maquette on a turntable. The Maquette.AVI and SkulGrey.AVI on this issue's CD-ROM are examples of this technique.

Digitizing

It is important that you match the horizontal and vertical registration of the entire series of images before you begin digitizing. If you cannot match the entire set, you must at least match each 90-degrees pair of images (e.g., 180 and 270). These are the image pairs you will load as backdrops in LightWave's Modeler. You should be especially careful to match the images vertically, so the tip of the nose, top of the head, and underside of the chin are each at exactly the same height in each image. The easiest way to do this is to load the images into separate layers in image-processing software such as Photoshop, then move the images around until the reference marks match, Figure D. The outer edges of the maquette's image are the worst places to start. The best reference points are those at a 45-degree angle to both images. For example, the point of the cheekbone is a clear reference point in both profile (Maq270B) and front face (Maq180B) images.

Once you have a set of matched images, launch Modeler. In the Display tab, click the Backdrop button. Load backdrop images in 90-degree pairs. I recommend Maq270B.bmp (left profile) and Maq180B.bmp (full face) as a good starting pair.

Drag the view divider to maximize the front and side views. Zoom in until the backdrop images fill the views. You should see something like Figure F.

At this point, you can choose whatever tool you prefer to create polygons. My personal preference is the Pen. I just knock out quick, sloppy four-sided polygons to cover the Front view backdrop, then more carefully select and Merge or Weld redundant points. If necessary, I tweak the points' positions after the Weld operations. They are usually pretty close. The new points all originate in the zero Z plane, Figure G.

When I've covered as many intersections as I can see clearly, I switch to the side view and drag each point in the negative Z axis until it matches the side view backdrop. Then I add new polygons in the side view that were not visible in the front view. This might not seem to be the most efficient way to work, but I can really get cranking without making mistakes. My overall productivity with this method is pretty good.

If you need an accurate, efficiently animatable model of a complex maquette or live human, you can use this method in combination with a Cyberscan. One of the problems with Cyberscan data is that it requires a lot of heavy editing by an expert to create an efficient mesh. Even a so-called efficient mesh may not have the point distribution you want for a good MetaForm cage. The solution is Impressions, a program reviewed on page 44. This Modeler plug-in is something like shrink-wrap, but controllable. What you do is load a raw Cyberscan as a background object, create an efficient mesh as described above, then use Impressions to conform the mesh to the Cyberscan. Since you can reiterate Impressions quickly, you can select individual points, reposition them, and reconform them to the Cyberscan very rapidly. This enables LightWave modelers to use the fastest, least expensive raw Cyberscan to create exceedingly efficient models with a minimum of effort and time.

This procedure also enables you to adapt a less-than-optimal object, for those times when you are forced to work with someone else's data. Imagine this: the producer's favorite nephew thinks he's a LightWave god, so the producer insists you animate the kid's obscenely overbuilt character objects. Load the nephew's mess into the background, create your own highly efficient geometry, and use Impressions to conform your model to the mess. You get to animate your own more efficient model, but it looks just like the nephew's. You thereby avoid a migraine and keep the producer and his idiot nephew happy. Life is good.

Back to Fred's head. The next step is to check the stats for non-four-sided polygons. Even while being careful, I managed to create two or three of these. A few minutes' work and they are gone, the object is all four-sided again. When the face and side views are done to the best of your ability, clear the backdrop images and load the Maq135B.bmp and Maq225.bmp images. Again, you need to work in 90-degree pairs to match the side and face views. Move and rotate the model to align with the new backdrop images. You should be able to set the Rotation using the numeric panel and typing in exactly 45.0 around the Y-axis. Your results should look like Figure H.

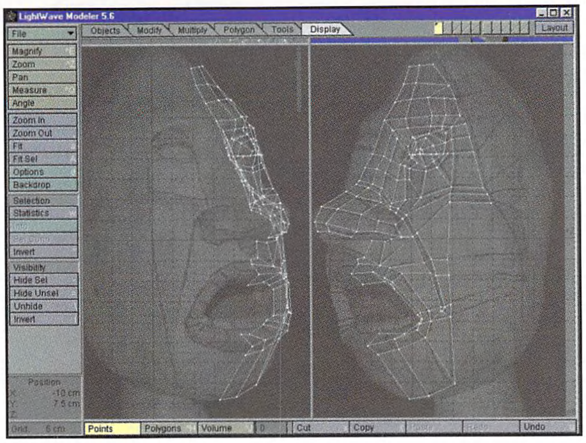


Figure H - Maq135B.bmp and Maq225.bmp images loaded as backdrops, and model rotated and moved to match.

Even with backdrops captured at 45-degree increments, you will probably run into undercuts and involute surfaces that you just can't see clearly. That is why you kept the maquette. For the final touches, you just have to eyeball the maquette and try to make the model in LightWave match it. Hey, this is still an art, not a science.

Once you have completed the right side of the head, you can use the Mirror function to duplicate it as the left half. Because Fred is far from symmetrical, this does not really give you a useful mesh. What it does give you is an identical number and distribution of points and polygons. All you have to do is move each point to match the left-side backdrop images. That's significantly easier than creating all those polygons from scratch, isn't it? Do this for the rest of the images, working your way around the whole maquette.

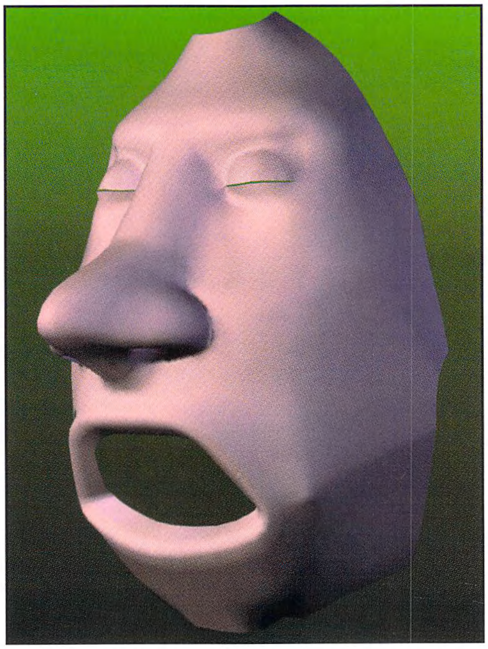


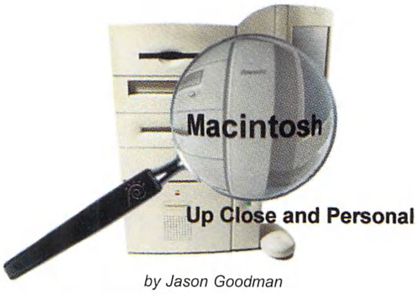
Figure I - Metaformed Fred face.

When you have added every point you can see in every backdrop image, test the model by executing MetaForm. You should get something like Figure I. You will notice that it is not an exact match for the maquette. That is because the object is simply a cage for the MetaForm process, not the final geometry itself. To get an exact shape, you have to tweak and distort the cage to allow for MetaForm's idiosyncrasies. You can either do that fine-tuning in Modeler or in the Layout boned setup for creating morph targets.

Well, that's all the space I can afford for this issue. In my next column, I'll explain the setups I use to create morph targets and animate Fred's head. Until then, try out these techniques on your own projects, and practice, practice, practice!

Doug Kelly is an author and animator in western Maine and the Editor of Keyframe Magazine. You can email him at dakelly@earthlink.net, or snail-mail c/o Keyframe magazine.

Correction to issue #8 Character Shop: the captions on pages 16 and 17 should have read, "Storyboard artists: Sandra Frame and Brian Kelly." Sorry, Brian! *This article is copyright © 1998 Doug Kelly. No reproduction in any form without written permission from the author.*

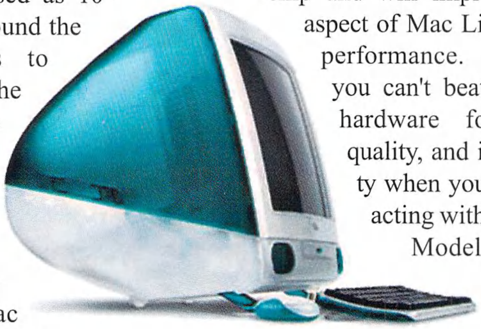


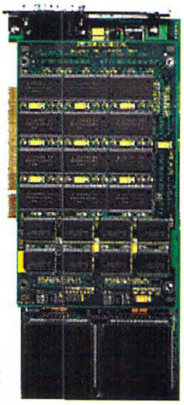
Macintosh
Up Close and Personal

by Jason Goodman

Mac users around the world rejoice as Apple rises like a Phoenix from the ashes of poor management. Of course, the mastermind behind this massive recuperation is the Mac community's favorite spin-doctor, Steve Jobs. Apple's once drain-circling stock is now on many analysts' buy lists. Sales and profits are way, way up. The huge success of the iMac has driven a lot of this, with some help from products like OS 8.5.

Inspire 3D is the perfect companion to the iMac. They both offer high performance, a wide array of features, and a bargain price. The iMac's speedy G3 processor and turn-on-and-go design make it a great machine for consumers and first-time buyers. As more users get their hands on this kind of computing power, 3D animators disguised as 10-year-old kids will crop up around the world. NewTek continues to report boffo Mac sales and the performance of Mac LightWave continues to improve. At this point, QuickDraw 3D has proven to be a technology without much of a future. The addition of OpenGL to Mac LightWave and Inspire is a big step forward. If you are not using the OpenGL versions, you really need to download them from NewTek's web site. Speed and stability improvements make OpenGL worth the wait.





If you are looking for 3D hardware acceleration on the Mac, your choices are much more limited than those of our PC brethren. NewerTechnology offers the RenderPIX line of Glint-based cards. Beta drivers allow RenderPIX to accelerate OpenGL as well as QuickDraw 3D, but the high prices of these cards make them an unlikely option for many users. I have not personally had a chance to test these cards but they have proven highly effective in accelerating QuickDraw 3D (no small feat) and have been well reviewed in other publications.

The more talked-about option for Mac OpenGL hardware comes from ATI. If you are the proud owner of an Apple branded G3 desktop or minitower, you have ATI hardware on your motherboard. Upgrade your VRAM to 6Mb and search ATI's web site for OpenGL drivers. I could not find them, and after several emails to ATI's tech support, I got more than a little frustrated. NewTek's Larry Bragg reports impressive OpenGL performance on G3 Macs with the ATI chips, but I could not get a straight answer from ATI as to their official stance on Mac OpenGL. Apple has also announced an enhanced iMac that will include a 300MHz G3 and an ATI Rage III on the motherboard along with 6Mb of VRAM. The G3 is a speedy chip and will improve every aspect of Mac LightWave's performance. However, you can't beat OpenGL hardware for speed, quality, and interactivity when you are interacting with objects in Modeler and Layout.

Here's an unrelated but important note for cross-platform users doing character animation. It seems that scenes created with Lock & Key on the Mac cannot be read on a PC, and vice versa. Dynamic Realities is currently investigating this problem and should have a fix posted by the time you read this.

To cap off this issue's column, I would like to pass along a small bit of production-related information. What do you do when you need to render poster-size graphics? This is always a hassle, no matter what platform you are on, unless you have a lot (1GB or more) of physical RAM. LightWave users should be aware of the differences in memory management between MacOS and Windows. A while ago, a real-world problem forced me to search for an answer to the age-old question, "How do you fit ten pounds of stuff in a five pound bag?"

As you may or may not know, MSD produces an annual event called LightWave Expo New York, LENY. Keyframe Magazine was one of the sponsors of LENY 1998. Being a relatively new publication at the time, Keyframe had not been an exhibitor at too many trade shows, and therefore lacked the signage necessary to adorn their booth. Pat Beck (then Keyframe's editor) asked if I could help by rendering an image of their logo large enough to print on a four-foot-wide banner. After some quick math, I realized that meant pulling out one of LightWave's ultra-hi-res custom settings. Renderings are limited to 8000x8000, but I do not think you would have the time or the inclination to render much larger than that. The final size of this rendering was actually 4000x7000, but that is still an image large enough to choke a horse.

When I started trying to render this nearly 8k logo, I actually did it on an Intel machine. The PC I used was a dual Pentium Pro 200 with 256Mb RAM, a Diamond Fire GL 3000 and 8.4Gb of hard disk capacity. I loaded up the scene, set the custom size and hit render. "Not enough memory to allocate z buffer" was the first error message, I believe. I am sure there are swap-space tweaks I could have tried to make this big daddy render, but as soon as the problems began I thought, "Why not try it on a Mac?" I am a Mac guy, and I find working out problems on the Mac much less painful than on a PC. I had just installed RealiTools (a plug-in used in the scene) for MacOS, and I figured this would be a very good test of cross-platform plug-in compatibility as well as the Mac's rendering ability in this tricky situation.

One problem presented itself immediately. If you store your content directory on a shared NT server drive (as we do at MSD), you will not be able to load a scene on the Mac without manually locating the resources. After finding all of the objects and images and saving a Mac-friendly version of the scene locally, Mac LightWave displayed the scene exactly as it appeared on the PC. I was using a PowerComputing PowerTower 180, a 180mhz 604 with 96Mb RAM and about 10Gb of hard disk capacity. The Mac was finally able to render the scene successfully, and tweaking it to do so was simple. The tweaking took a bit of time and some trial-and-error. Nevertheless, this test proves that you can render just about any size image with Mac LightWave, even if you only have a modest amount of RAM.

Under normal circumstances, high performance applications like LightWave do not like virtual memory. But when you need to render an image that is well over the size that will fit in physical RAM, you need to call on this old standby of the MacOS. The first step is to determine how much RAM you will need to render the scene. When LightWave renders a frame, the first thing it does is allocate enough RAM to store that entire frame. This RAM is called the frame buffer. You can calculate the size of the frame buffer in kilobytes by multiplying the width of the image (in pixels) by the height of the image, then multiplying that number by four. The frame buffer for the Keyframe banner occupied just over 109Mb. The frame buffer is where LightWave stores the entire rendered frame before it is saved out in the image file format of your choice.

The other parts of rendering that require RAM are the individually rendered segments. To determine the amount of RAM required for a segment, multiply your image's width by its height, then multiply the product by 24. Images loaded into the scene will also occupy RAM. Windows users can get the exact value for RAM usage of a given scene by hitting the "W" key and checking out the scene statistics panel. For some unknown reason, NewTek has left this valuable information out of the scene statistics on Mac LightWave. The best way to approximate the RAM usage of a scene on the Mac is to check the "About This Computer" item in the Apple menu. This will show you the amount of RAM you have allocated to LightWave and the percentage of that RAM that is being used by the current scene. Add this number to the number required for your desired resolution, crank up the virtual memory, boost the RAM partition in the "get info" box for LightWave, restart your Mac and let 'er rip.

This technique has also been tested with LWSN (Mac ScreamerNet nodes) and it works well. A NewerTechnology G3 enhanced 6100 with only 72Mb of physical RAM rendered a frame in two minutes fifty seconds. The same frame rendered on a 533mhz DEC Alpha with 128Mb of RAM in one minute fourteen seconds. This is impressive when you take into consideration the incredibly bad disk subsystem of the 6100 and the massive amount of disk paging that was going on. This time also compares favorably to a 200mhz Pentium Pro with 256Mb of RAM, which required just over two minutes to render the same frame.

Good luck with this technique! Have yourself a happy holiday, and we'll see you next time!

Still Ssssmokin'... Continued from page 42

The best way to get an idea of how I scaled the Bones is to load the scene and check out my Scale keys using the graph editor. Note that I animated the reference null going from Y=188.8m at frame zero to Y=-196m at frame 60. The reference null, as you will remember, controls the bulge texture. What the reference null's motion does is create a nice bulge traveling through the smoke trail.

Figure 4 shows the complete rendered sequence. With a little more effort, you can create even more detailed displacement maps that will give a unique appearance to the smoke. Don't be afraid to try your own maps or animation techniques. Now that you know the basics, the rest is up to your imagination.

It should be obvious that this kind of effect is not good for close-up shots. You cannot fly a camera through the exhaust for example. It is also difficult to get more complex animation; you will still need a particle system for that. When I first began this tutorial a month or so ago, I found no tool, not even Steamer, could produce truly volumetric, graceful plumes of smoke. However, as we all know in our profession, technology changes rapidly, and this is especially true in the world of NewTek. With the release of HyperVoxels 2.0, we have the ability to create true volumetric plumes of smoke quickly (yes! It is fast!). "And what about animating?" you ask. Particle Storm 2.0, need we say more?

I will be sharing my experience with HyperVoxels 2.0 and Particle Storm 2.0 in the next issue, and I can assure you, we will be creating some massive destruction and explosions. Don't worry, it will all be digital, so the neighbors won't mind. Until then, keep on Keyframing!

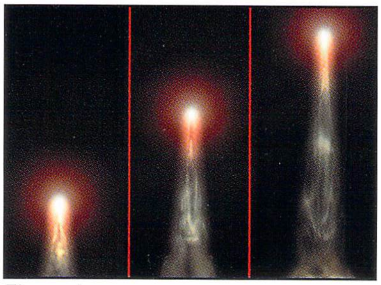


Figure 4

Answers to Your LightWave questions

by David Warner

NewTek has been quite busy since the last issue! With the release of a new LightWave 5.6 patch, an amazing new version of HyperVoxels, and the release of the Frame Factory digital video capture/playback device, there has been a LOT to talk about on the LightWave mailing list!

Boasting UNCOMPRESSED D-1 digital video capture and playback, the Frame Factory should provide an excellent input/output option for LightWave and Aura users because these two applications are tightly integrated with the board, allowing you to digitize, edit, enhance, and record video with little or no loss in video quality. When you consider that the Frame Factory comes bundled with LightWave v5.6 -and- Aura v1.0, the under $4000 price tag is quite a deal!

Of course a number of people on the LightWave mailing list have voiced their concerns about having to buy new copies of LightWave (and Aura) when they already own these programs, but it seems like a pretty safe bet that a stand-alone version of the Frame Factory will eventually be made available to those of us who already have these programs. Personally, I think that it looks very promising and could be the PC Toaster / Flyer solution that a lot of people have been waiting for. If NewTek takes the best parts of the Video Toaster / Flyer system and adds the power of LightWave and Aura, they could have a really amazing product on their hands!

LightWave took another solid step forward with the release of version 5.6b for Intel and DEC Alpha users and version 5.6c for Macintosh users. This new upgrade fixes a number of pesky bugs in Layout and some of the more popular plug-ins, like Steamer and Skytracer. It also addresses an annoying problem that LightWave has always had with updating displaced points in real time. Users will no longer have to advance a frame and then back-up to see the results of an applied displacement map or plug-in. This improvement alone makes the free upgrade worth downloading from NewTek's web-site, but the long list of bug fixes is quite welcome!

The other big news is the HyperVoxels 2.0 plug-in for LightWave. NewTek has pulled out all the stops by taking HyperVoxels to a level of usefulness that few people expected. Unlike the initial free release of HyperVoxels 1.0, which is included with the original LightWave 5.6 upgrade, this new version of HyperVoxels has a price tag of $249 for a downloadable version and $269 for a version that comes on CD-ROM. After working with this cool new plug-in for almost a week, I can tell you that it is well worth the money!

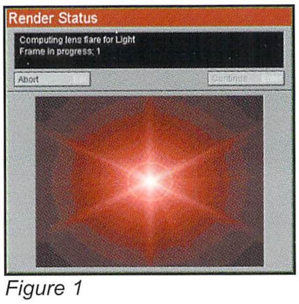
New features like built-in cloud, smoke, and explosion effects, faster render speeds, a number of new HyperTextures, and the ability to layer HyperVoxels for true 3-D volumetric effects are just the tip of the HyperVoxel 2.0 iceberg. Probably the most exciting new feature is the ability for separate HyperVoxel objects to interact with each other! Imagine being able bring two puddles of water close to each other and have them merge into one object, or being able to model and animate entire HyperVoxel characters just by bringing different objects close to each other! These are some very advanced and VERY exciting new tools and the entire LightWave community is buzzing about the power of HyperVoxels 2.0!

In addition to all the ranting and raving about these cool new NewTek products, the mailing list has been filled with the usual flow of LightWave questions and answers, so here is this issue's selection of On-Topic material from the LightWave mailing list.

Q I've rendered an animation that contains a lens flare and I want to composite this animation over some digitized video, but the Alpha Channel created by LightWave does not contain any data for the lens flares. Why is this happening, and how can I get the lens flare to appear correctly in the Alpha Channel?

A LightWave renders lens flares as an additive effect and you can see this happening if you watch the different phases that LightWave goes through as it is rendering an image, Figure 1. Notice that lens flares are rendered separately from the rest of the image.

One way to get around this is to render your lens flares in a separate pass from the rest of the scene. Just render the animation with all of the lens flares turned off, then render the animation again with everything except the lens



Computing lens flare for Light
Frame in progress: 1

Figure 1

flares hidden from view. Then you would do an additive composite to layer the separately rendered lens flares on top of the composited animation and digitized video.

It should be noted that if you turn on the Fader Alpha Mode option in the Render panel, then lens flare data will appear correctly in the Alpha Channel, but this will also change how color data is rendered in the image sequence so that transparency values are totally controlled by the Alpha Channel. This a great way to render your animations if you are definitely going to composite them into some other footage, but your rendered image sequence will look odd if you do not assemble the animation while using the Alpha Channel data.

Q I am running LightWave v5.6 on a dual processor system. I'm sure I have everything configured correctly but LightWave's render speed seems to have only increased by 20 to 30 percent. What's wrong here?

A A common misconception is that if you run LightWave on a dual processor system, your render times will automatically be cut in half. There are many situations where you will see a 100% speed increase but there are also many times when the speed increase is not as significant. How much of an improvement you will see depends entirely on the type of the scene you are rendering. Heavy ray-tracing with lots of lights and layered transparencies will benefit greatly from a dual processor setup, but if you're just rendering a quick preview or not ray tracing anything in the scene, then you will not see much of a speed increase. Try doing some benchmarks with a complex ray-traced scene and you should see a big increase in render speed.

Q I've modeled a humanoid character and added bones the way a number of tutorials have shown that they should be added but when I try to animate the character, the bones end up deforming the mesh in very strange and unexpected ways. My character is a few hundred meters tall, so I'm wondering if that could be a possible reason for the bones not working correctly.

A A very frequent cause of this quirky bone behavior is that objects are modeled at an extremely small or extremely large scale. In most cases, you should model your objects to scale so that an average sized humanoid character is a meter or two tall. However, if you are modeling something like a small bug or a kilometer-tall giant then it is definitely NOT a good idea to model the object to scale. For these extremely small or extremely large objects, you should model them at a neutral size of 1 or 2 meters in height or width, then add your bone skeleton, and then scale the object to whatever the desired size may be. This will scale the size of the bones as well and their influence will be applied in a more predictable manner than if your original object was very large or very small. A general rule of thumb when working with bones is that they tend to be most happy when applied to objects that have an initial size no bigger or smaller than a few meters. Happy bones make for a happy animator!

Q I created a super-hero character and need to put an emblem or decal on his chest. I applied a Planar image map and used a reference null object to position and size the texture just right, but the texture is visible on the character's back as well as the chest. How can I fix this?

A One way would be to give the character's chest and back different surface names. This can work very well for objects with sharp edges but with an organic shape, like a humanoid object, you will probably run into smoothing problems where the two surfaces come in contact with each other.

An even better way to limit the area affected by an image map is to simply use a Texture Falloff value along the appropriate axis. In this case, if you applied the image map along the Z axis and the character's body was about half a meter thick, you would want to apply a Texture Falloff of at least 200% along the Z axis, so that the image map, positioned right on the character's chest, would fade off to nothing by the time it reached the character's back, Figure 2. The greater the falloff percentage, the faster the texture will fade to nothing. This can be a very powerful way of sticking decals precisely where you need them without having to rename a bunch of polygons in your object.

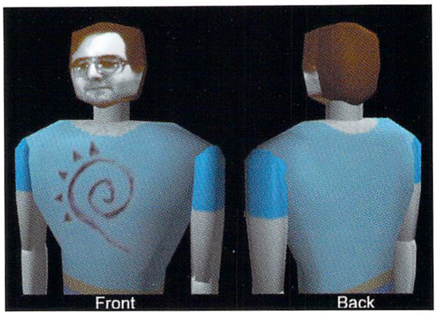


Figure 2 - The LightWave logo is mapped onto SuperDave;s chest with a reference Null object and a Texture falloff of 500% to prevent the logo from showing through onto the character's back.

Q I have noticed that every time I type a number into one of the numeric areas and then close the panel, the value reverts to the previous setting. Why is this happening?

A This is a common problem that many Macintosh users have experienced because most Mac applications will automatically accept a new number as you type it, but since LightWave is essentially a Windows application that has been ported to the Mac, things work a little differently. The solution to this frustrating problem is that you must press ENTER or RETURN after you type in a new number. This will correctly save the new value you have entered.

Q I am having trouble getting a SkyTracer-rendered sky to blend smoothly at the horizon of an ocean. Any suggestions?

A One way to do is to render the SkyTracer sky separately from the rest of the scene and then put that image sequence in the Background, using the

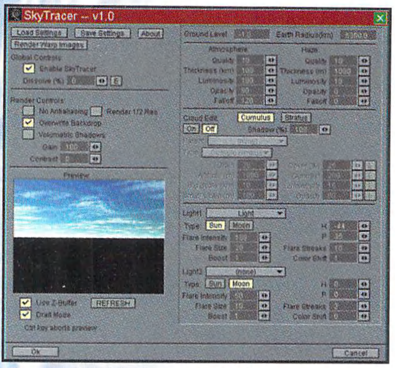

SkyTracer -- v1.0
Load Settings
Save Settings
About
Render Warp Images
Global Controls
☑ Enable SkyTracer
Dissolve (%)
Render Controls
☐ No Antialiasing
☐ Render 1/2 Res
☑ Overwrite Backdrop
☐ Volumetric Shadows
Gain
Contrast
Preview
☑ Use Z-Buffer
REFRESH
☑ Draft Mode
Ctrl key aborts preview
Ground Level
Earth Radius(km)
Atmosphere
Haze
Quality
Thickness (km)
Thickness (m)
Luminosity
Opacity
Falloff
Cloud Edit
Cumulus
Stratus
On
Off
Shadow (%)
Light1
Light
Type
Sun
Moon
Flare Intensity
Flare Size
Boost
H
P
Flare Streaks
Color Shift
Light2
(none)
Ok
Cancel

Figure 3 - Skytracer interface

Effects Panel. Then you would apply some fog in the distance to blend the horizon into the sky. You could use the Background Fog option if it were not for the fact that SkyTracer leaves that ugly black space from the horizon line down, Figure 3. You can carefully match the edge of your ocean so that it is just above the horizon line of the sky and then use the Background Fog option to blend that area of the screen, but this will require a bit of experimentation and may cause problems if your camera is moving.

Another option is if you use the Render Warp Images option in SkyTracer to create a pre-rendered sky and then use a program like Photoshop or Aura to mirror the sky from the top half of the image to the bottom half, you'll have a set of sky images that are perfect for using with the Background Fog option. Doing things this way will also significantly reduce your render times because SkyTracer does not have to render a sky for each frame of your animation.

Q Do you have any suggestions for decreasing the amount of time it takes to render each frame in an animation?

A Try any or all of the following tricks:

- Increase the Segment Memory (in the Camera panel) until the image renders as one segment. If you are rendering at Medium Res, then a Segment size of 8.8mb should do the trick. That will help a little but you also DO NOT want to increase the Segment Memory size so much that it makes your computer use virtual memory. Unless you have a large amount of memory (over 256megs) any images rendered in High or Print resolution will most likely need to be rendered in multiple segments.

- If you have transparent objects, try not to layer them on top of each other; that kills render times. If layered transparencies are unavoidable, then try to break out some of the transparent surfaces and make them separate objects with no transparency whatsoever, then use a Dissolve percentage to fade out the object instead. You can not do this in all situations, but this trick can be very handy sometimes.

- Make sure you don't have any particles clumped together into a single point in front of the camera. This will bring LightWave's renderer to a crawl.

- When ray-tracing reflections, be careful about using too many Bump Maps because reflected bump maps can really increase render times.

- Try substituting image maps for procedural textures. Procedurals take a lot longer to render than mapped images. If you need the look of a procedural texture, then try rendering out an image map with that procedural applied to a flat plane facing the camera. Render at a resolution high enough to avoid jaggies during any possible close-ups, then apply this image map where your procedural is used.

- Try rendering your animation in a Letterbox resolution / format. This will decrease the number of pixels actually rendered in each image. You can use the Limited Region function to define the exact you want to render but you will have to make sure that the frames are centered vertically when you record the animation to tape.

- If you're really desperate and you can sacrifice some image quality, render the animation as an image sequence at a lower resolution, then apply that image to a flat plane facing the camera and re-render the animation image sequence at a higher resolution with antialiasing applied to the image map. This will stretch your animation up to the desired output size and smooth out the jaggies. You'll end up with a bit of a soft-edge effect but the quality should be more than adequate for previews, client proofs, or even output for a low-budget client or someone who has an untrained eye. :)

Depending on the type of animation you are doing, there are certainly other ways to decrease render times, but the above ideas should go a long way toward speeding up your renders.

Well, that will do it for this issue's collection of On-Topic discussions from the LightWave mailing list. As mentioned in the last issue, the LightWave mailing list was due to be moved to a new e-mail server hosted by our friends at Keyframe Magazine. That move has not yet taken place, but keep watching this column for info about the upcoming changes!

About the Author: In addition to running the internet's LightWave mailing list, David Warner hosts an internet-based LightWave users gallery, an online monthly LightWave contest, and in his spare time he produces the TutorVision 3-D CD series of multimedia tutorial CD-ROMs for LightWave. For more information, please visit Dave's business web site at http://www.tv3d.com or send snail-mail to David Warner at: P.O. Box 310, New Baltimore NY 12124.

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Making Surfaces With Aura

by Michael Ash

One of the first questions a lot of people ask about Aura is "Can I paint LightWave objects with it?" The answer to that question is ... "not yet" and "yes." Currently, you cannot load a LightWave object and paint on it. However, you can make image maps for use with LightWave. This article will show you the basics of how to do that.

In LightWave

The first step is to open Modeler and load the object you want to make surfaces for. For this article I decided to repaint the Fokker DVII object that I built for the LightWave 5.5 and 5.6 content CD-ROMs. It's not the world's greatest model, but it will work for our purposes. To save time I will use the keyboard shortcuts.

Press the d key for the Display Options panel. Uncheck Show Points and Grid, then click OK. Press Ctrl+h to make sure you are in Polygon selection mode (at the bottom of the Modeler screen). Press the w key to bring up the polygon statistics window. Near the bottom of this window is a field labeled "With Surface:" and just below that, a drop-down list of all the surface names. Choose a surface, then click on the + button next to "With Surface:" to select all the polygons with that name. All those polygons should be highlighted now. Close the window by clicking on the x box in the window's upper right corner.

Choose the Display tab. Now look at the list of tools on the left side of the Modeler screen. Near the bottom you will see a group named Visibility. Click on Hide Unsel, or press the = key. Now all you will see are the polygons with the selected surface name.

Here comes the tricky part. Look at the three views and ask yourself, "If I had to apply an image map, which view would I use?" In this case, I want to make an image map for the side of the airplane body, so I chose the left side view. Click on the center of the crossbars that separate the four window views, then drag it so only the left side view dominates the screen. Now press the < or > keys to zoom in or out until the selected polygons fill the window. (Figure 1)

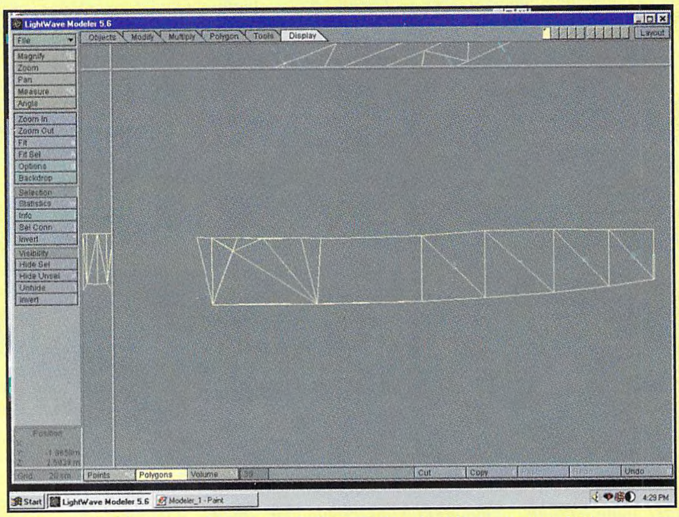
Make sure you can see all of the polygons with the selected surface. Now hit the / key to deselect the polygons. You are now ready to take a snapshot of your screen. Press the Print Scrn SysRq key to copy a snapshot of your screen to the system clipboard.

In Aura

Open Aura. In the opening window, under Page Size, set the resolution to Display. Your Aura project size will now be the same as your system screen size. (Figure 2)

Open the Edit panel, then scroll down to New Layer From Clipboard. The screenshot you made in Modeler should now be a new layer in Aura. Before you start painting, create a new layer above your screen capture. If you make a mistake or change your mind while painting, you can always erase the layer without having to recapture the Modeler screen.

You are now ready to begin painting your surface images. One of the great features in Aura is you can make all of your maps on separate layers. I usually lay down the panel lines for my diffusion map first, then make any dirt streaks I need on another layer. Next I make my specular maps, and finally the


LightWave Modeler 5.6
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Magnify
Zoom
Pan
Measure
Angle
Zoom In
Zoom Out
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Backdrop
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Statistics
Info
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Invert
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Hide Sel
Hide Unsel
Unhide
Invert
Points
Polygons
Volume
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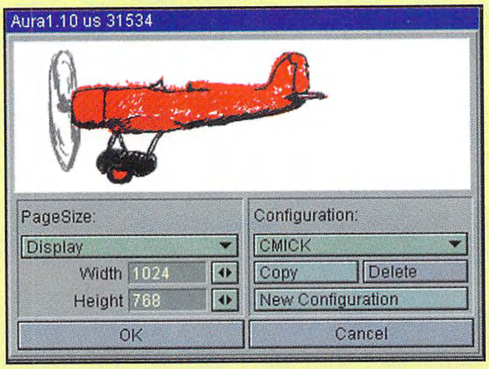
Undo
Start
LightWave Modeler 5.6
Modeler_1 - Paint
4:29 PM

Figure 1 - Selecting polygons and zooming in for a screenshot.



Aura1.10 us 31534

PageSize: Display

Width 1024

Height 768

Configuration: CMICK

Copy
Delete
New Configuration
OK
Cancel

Figure 2 - Set Page Size to display the size of the screenshot.

color maps. If I have to add any lettering or symbols I place them on separate layers. If I need to change anything, I can simply reload the Aura project and make changes to one layer without having to repaint all the other maps as well.

I made the color map for the top wing by cheating. I went down to the hobby store and found a decal sheet for German World War I aircraft. I scanned the decal, then cropped the image to fit exactly over the polygons of the Modeler screenshot. (Figure 3) I made the wing insignia on another layer.

The hardest part was painting the name. I based my model on a Fokker DVII flown by Whiliem Hippert in 1918. He painted his girlfriend's name on the upper wing. I had no luck finding a font to match, so I hand-painted the name with a drawing tablet. I made the black outline by changing drawing mode from Color to Behind. This enables you to paint on the alpha channel of the layer with out screwing up what is already on the layer. (Figure 4)

Saving the Brush

Once you have created the maps, you need to save them out in a format that LightWave can use. You can do this by cutting out and saving it as a brush, not an image. This enables LightWave to automatically size it to fit your polygons. As an example, let's cut out the color map. Select the layer with the color map, and draw out a box just a little bit larger than the polygons in the screenshot. Switch to Display Current Layer, or just hit the = key. Select the Brush Cut Out tool, then cut out the brush just within the guidelines you set before. Note that you can only cut out what is on the layer you are working on. If I wanted to combine the colors and lettering I had set up before, I would have had to merge those layers first. If you click on a layer and hold the mouse button down, you can move it up or down. Note that the color of the layer will change to black with a color outline. If you then let go of the mouse button, the layer you had picked up will be copied onto the current layer.

Now that you have your brush cut out, go to the File/Mode menu and choose Mode. I save out all images in ILBM (also known as Amiga IFF) format. Now go up the menu to Export, then choose Brush -- ***not Image***. If you save the file as an image, it will include the entire screen. When you export it as a brush, the file will only include the cropped image of your brush. You can also save out a sequence, for example, if you had created an animated bump map.

Now all that remains is to go into LightWave and apply the maps to the appropriate surfaces. (Figure 5) Remember, you don't have to hand-paint all your image maps. If you have Photoshop, you have all the Photoshop filters to help you create maps.

Bonus Tips

In closing, here are a few tips that a lot of people don't seem to know about. First is the background video layer. Look at your Layer panel. You will see your layers, then just below them a smaller layer. Place your mouse pointer over it, right click and hold down. A panel will pop up with None and Select. Choose Select and an image sequence requester will pop up. Choose a sequence of images. The layer will become a red line.

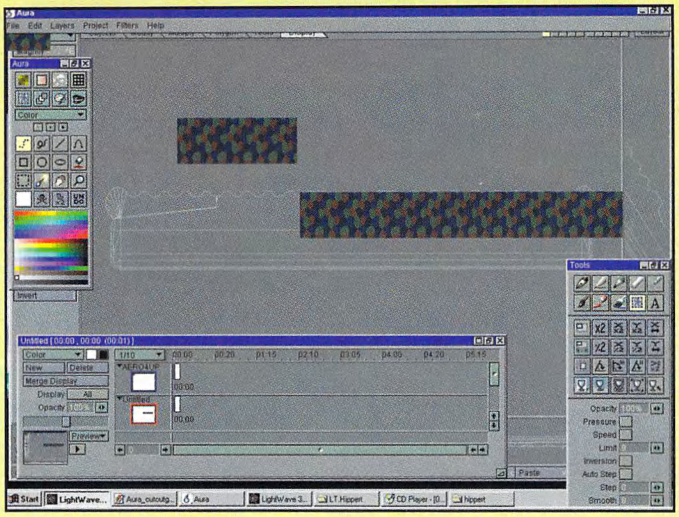


Figure 3: Scanned upper wing decal, cropped to fit.

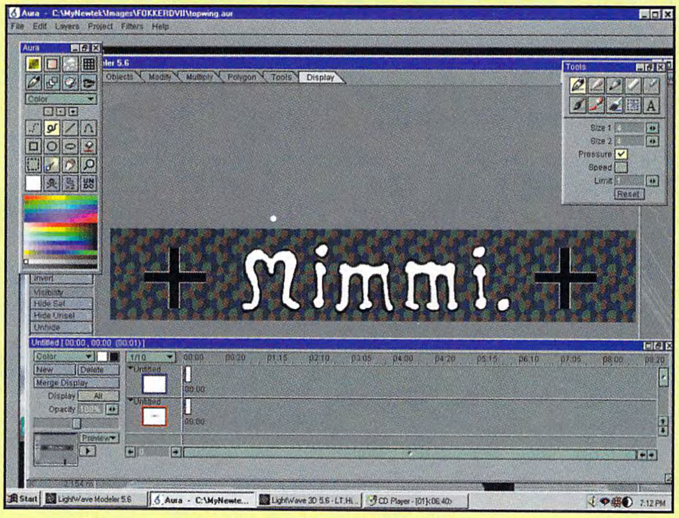

Aura - C:\MyNewtek\Images\FOKKERDVII\topwing.aur
File Edit Layers Project Filters Help
Objects Modify Multiply Polygon Tools Display
Tools
Mimmi.

Figure 4: Name hand-painted on upper wing map.

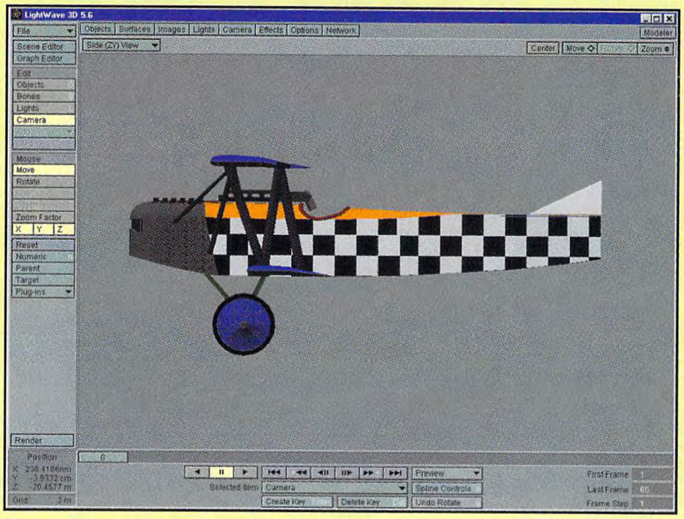
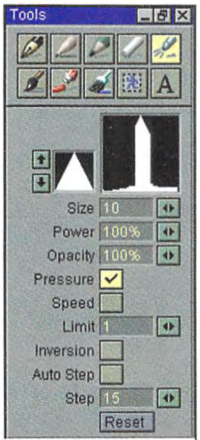

LightWave 3D 5.6
Objects Surfaces Images Lights Camera Effects Options Network
Side (ZY) View
Modeler

Figure 5: Fuselage map applied to surface.

Above that, drag out a series of frames and turn it into animation layer. As you scroll through the frames, Aura will grab the current frame plus the one before and after it. Why is this important? It saves RAM and hard drive space. Aura doesn't have to load the whole sequence into RAM to use it. You cannot paint on the background video layer but you can use it to composite images.



Size 10
Power 100%
Opacity 100%
Pressure ☑
Speed ☐
Limit 1
Inversion ☐
Auto Step ☐
Step 15
Reset

Figure 6: Creating an airbrush tool envelope.

On the Airbrush panel you will notice a large black and white box, the Tool Envelope. To the left of that is a smaller box with a pattern in it, the Tool Presets. Click the up and down arrows and the pattern will change. Now click in the smaller box and that pattern will be transferred to the larger box. Choose the Airbrush and notice how the tool changes for each preset. You can also right-click, then draw in the Tool Envelope to make your own envelopes.

I use the airbrush with different presets to make rivets. In order to make a row of rivets, choose the airbrush with the Line drawing tool. Set your airbrush size, let's say to 10. On the bottom of the Airbrush Tools panel, set the step to 20. This will place an airbrush dot down every 20 pixels, Figure 7.

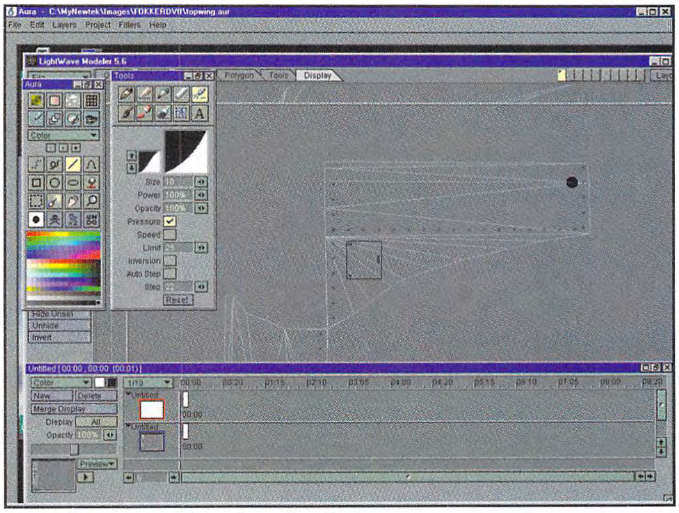


Figure 7: Airbrush dots placed as rivets.

Finally, remember the only way to learn a program is to explore and push all the buttons. (Note: The U.S. Air Force Missile Command frowns on this method of learning.)

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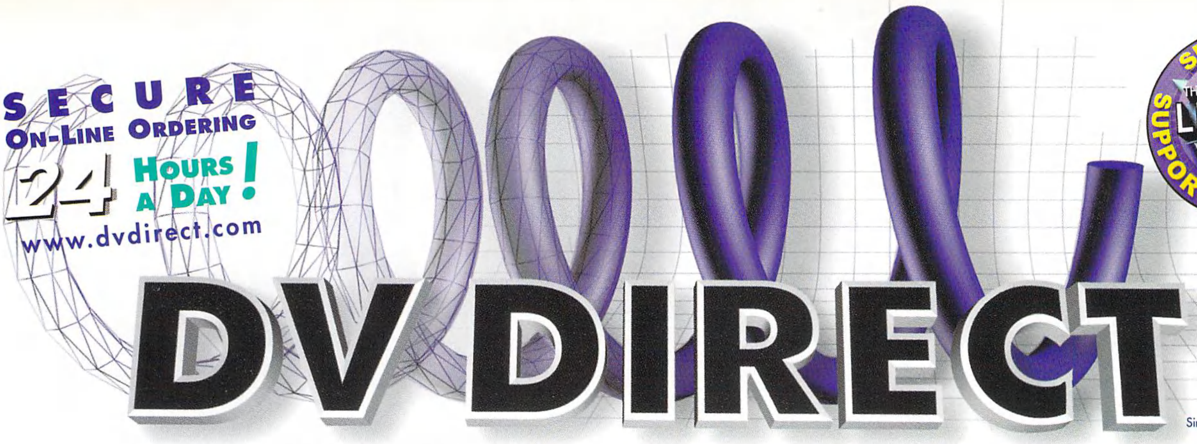

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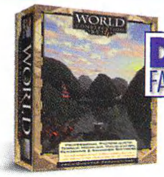

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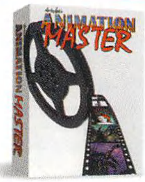

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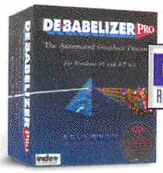

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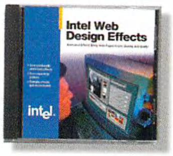

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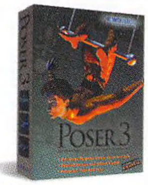

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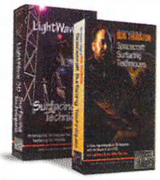

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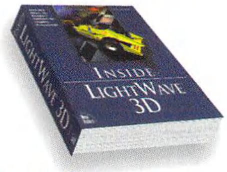

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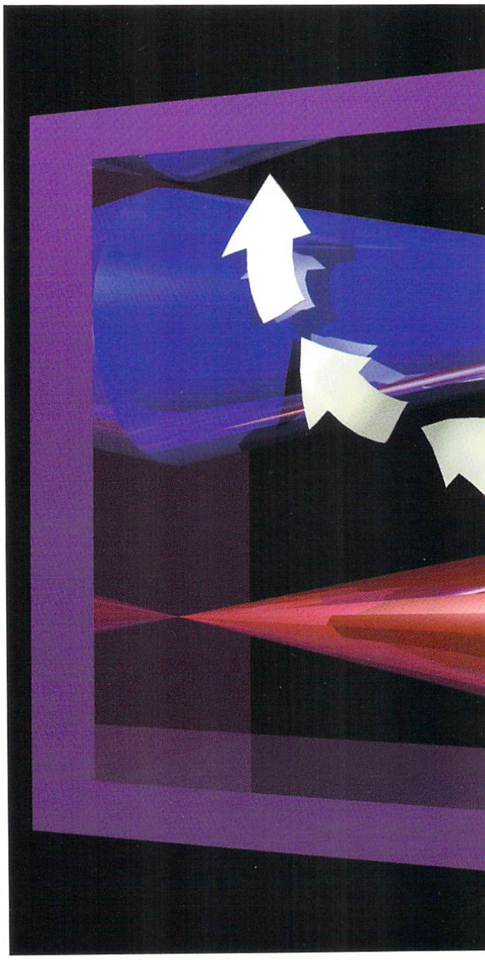
Reader Service #118

Five Minute Miracle

by Pat Beck

LightWave is a 3D application that covers a lot of ground. It finds its way into the biggest blockbuster motion pictures, it dominates the small screen for CGI, and is the backbone of many bread-and-butter industrial video productions. Perhaps the most apt representative of the industrial graphic is the flying arrow.



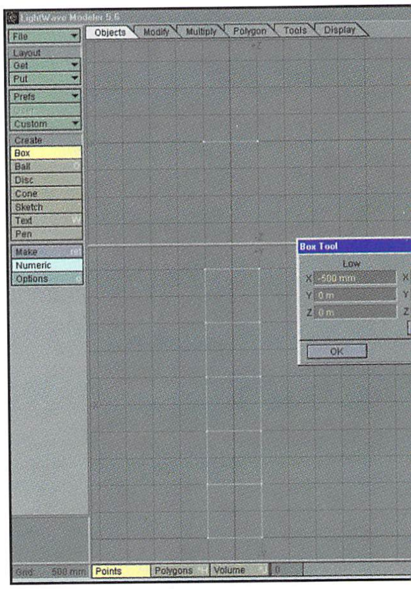
Flying arrows have become such a graphic staple that it is easily taken for granted. Typical applications are to show air passing through dust filters, oil being pumped through a machine, or data being routed through a network. Any time it is necessary to portray the path something takes or the flow of material, nothing communicates the concept better than big pointy arrows.

The typical flying arrow job is pretty straight forward. It generally consists of a background graphic over which you are instructed to animate arrows. A more advanced job is to recreate something as a 3D object, then fly the arrows through it. While that is entirely feasible, it would almost certainly take longer than the five minutes I am allotted by my limited attention span.

Yes, you can use LightWave to create some very nice flying arrows that twist and turn along a path you define. This involves a little bit of modeling, a little bit of texturing, a little bit of getting deformed. In working out this technique, I gained a better understanding of the workings of texture mapping. I hope that, as you work through this tutorial, you will too.

How it Works

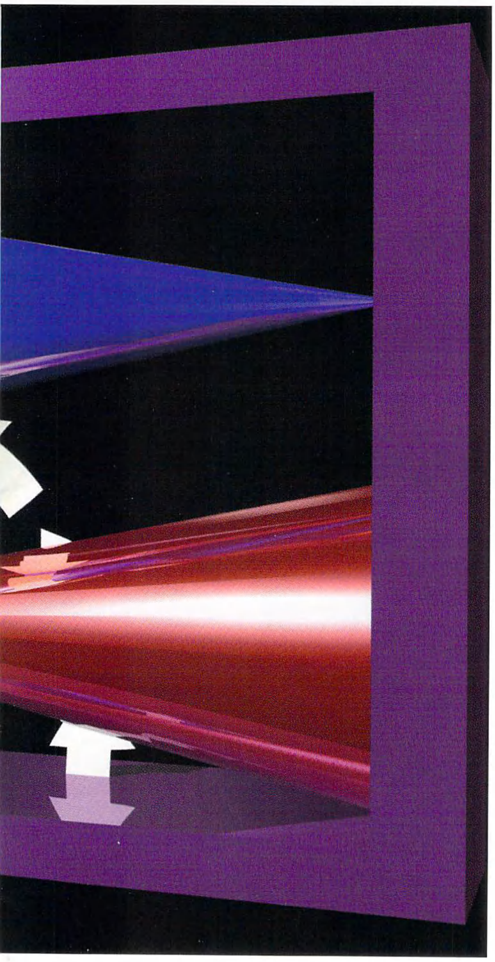
In brief, we model a tall flat rectangle, map an image of an arrow onto it, then give the map a velocity that enables us to determine a loop point. By subdividing the original rectangle, we can modify its shape (using bones or morphing) so we can make our arrows curve around corners and follow a twisted path. By applying the same arrow map to bump and clip mapping, we can give



X -500 mm
Y 0 m
Z 0 m

Grid 500 mm

Figure 1: Screenshot of the construction
an arrow strip in Modeler.



our simple rectangle the illusion of much more complex geometry.

Step 1: Create the arrow strip. In Modeler, create a rectangular plane that is 1 meter wide and 5 meters tall. In the objects menu select Box and set the numerical values for low so that x=-500mm, y=0, z=0. For the box high values, x=500mm, y=5m, z=0. Set the segments for x=1, y=5, z=1. Hit the enter key or click on the make function to generate the object. You should have an object that is a rectangle consisting of a stack of 1 meter squares, as in Figure 1. Name the surface of this object "ArrowFace" and save the object as arrowstrip.lwo.

Step 2: Create the arrow map. You will need an image of a white arrow on a black background. The image needs to be more or less square to work properly. How you create the image map is up to you, as long as it roughly conforms to the proportions shown in Figure 2. This arrow map was created using a very basic LightWave model, but an arrow image create with a paint program would work equally as well. Name the image "ArrowMap."

Step 3: Texturing the object. (See ArrowTexture) Go to LightWave Layout and load both the ArrowStrip object and the ArrowMap image. Open the Surfaces panel and select the ArrowFace surface. Click the T button of the Diffusion texture attribute, then select ArrowMap as a Planar Image Map on the Z axis. No resizing should be necessary because we purposely built our object based on a 1 meter square.

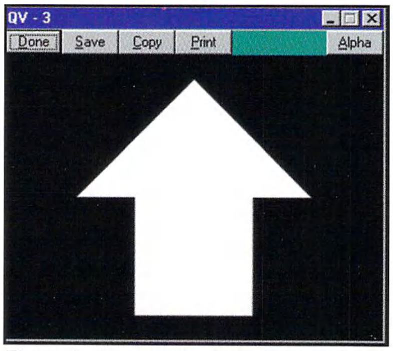
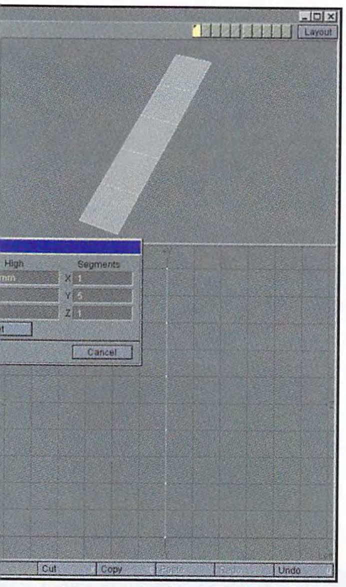

QV - 3
Done
Save
Copy
Print
Alpha

Figure 2: Arrow object rendered out to be used as the arrow image map.

Step 4: Add map velocity. Think this through carefully. The ArrowMap image is tiled onto the ArrowStrip object at a size of 1 meter by 1 meter. For it to loop properly, it has to move its full height during the course of the number of frames we determine. The formula is, therefore, distance divided by frames. If you want the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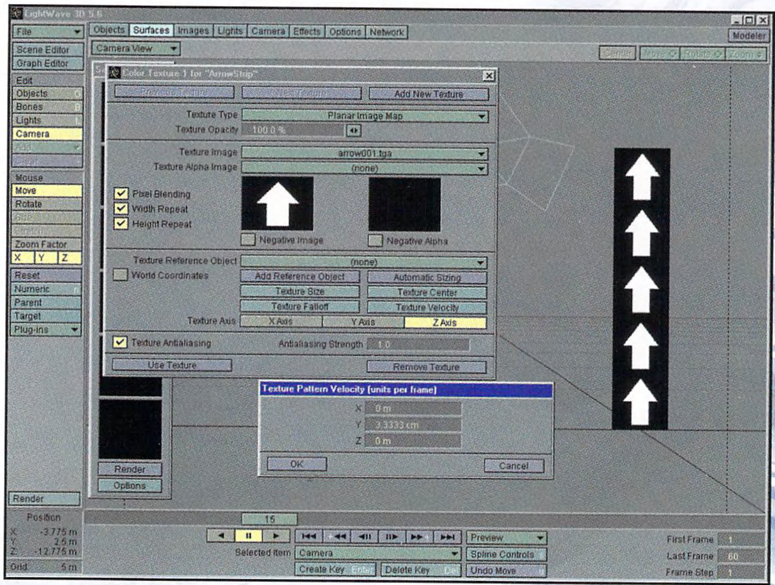
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Effects
Options
Network
Camera View
Modeler
Add New Texture
Texture Size
Texture Center
Texture Falloff
Texture Velocity
Add Reference Object
Automatic Sizing
Use Texture
Remove Texture
Render
Options
OK
Cancel
Preview
Spline Controls
Create Key
Delete Key
Undo Move
First Frame
Last Frame
Frame Step

Color Texture 1 for "ArrowStrip"

Texture Type: Planar Image Map
Texture Opacity: 100.0 %
Texture Image: arrow001.tga
Texture Alpha Image: (none)
☑ Pixel Blending
☑ Width Repeat
☑ Height Repeat
☐ Negative Image
☐ Negative Alpha
Texture Reference Object: (none)
☐ World Coordinates
Texture Axis: X Axis / Y Axis / [✓ Z Axis]
☑ Texture Antialiasing
Antialiasing Strength: 1.0

Texture Pattern Velocity (units per frame)
X 0 m
Y 3.3333 cm
Z 0 m

Position
X -3.775 m
Y 2.5 m
Z -12.775 m
Grid 5 m
Selected Item: Camera
15
First Frame 1
Last Frame 60
Frame Step 1

Figure 3: Screenshot showing the Surfaces panel settings for the arrow strip. Note the Texture Pattern Velocity settings.

map to travel its full height of 1 meter over the course of 10 frames, the velocity up the Y axis would be 1/10th of a meter (10cm). For this tutorial, you want a 1 second loop, which means 30 frames at standard NTSC video frame rate. Divide 1 meter by 30 frames, giving a map velocity of 3.333cm. In LightWave version 5.5 and up, you can enter the equation 1m/30 in the Y Texture Pattern Velocity field and LightWave will do the math for you.

A test render at this point should show a white arrow mapped repeatedly onto the ArrowStrip object. Rendering sequential frames should show the arrows moving upward. This is where 5.5 users get their money's worth. If you have Show Textured Surfaces enabled, by jumping from the Surfaces panel to Layout, it is possible to see the arrow image mapped onto the object and moving in real time.

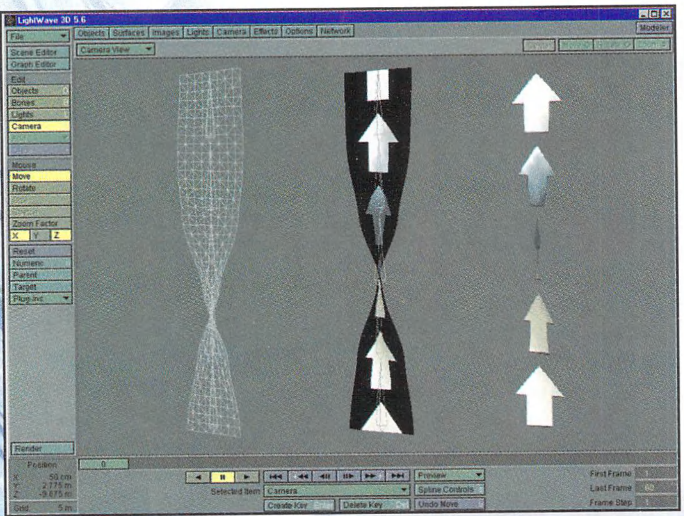
You could have applied the ArrowMap image as a color map, but if you followed Step 3 (above) you applied it as a diffusion map. This gives you more flexibility in coloring the arrows. Quite often, a client will insist that the arrows be bright, saturated red, a color notorious for causing problems in industrial-grade video equipment. By using a diffusion map, you are free to adjust the RGB values of the arrows for the best results down the line.

Getting Bent

If all you need are straight arrows, your job is done. However, chances are the job will require the arrows to curve and bend around corners. This will require you to return the ArrowStrip object to Modeler and subdivide it. You have several options here, all of which are beyond the scope of this tutorial. Here are brief descriptions of two methods you can use. Choose the method that is the most comfortable for you.

You can use a bone chain to conform the ArrowStrip object to the necessary shape. Using a heavily subdivided version of the original ArrowStrip object, you can position and rotate bones to twist the object into the desired shape (Figure 4). It's often helpful to use the Show Background option to precisely position your arrows.

If you suffer from bone fear and are more comfortable in Modeler, you can use MetaMorphosis to modify the shape of the ArrowStrip. Once you have your original straight, flat object subdivided and textured, save it as the source object. Use the bend and twist tools in Modeler to pound it into the shape you need, then save the modified version as the target object. Load both objects into Layout and set up a 100% morph from source to target. Don't forget to 100% Dissolve the target object or move it off screen so it isn't visible. The flat straight object will conform to the shape of the twisted version, yet the arrows are still following the surface of the object.



X 50 cm
Y 2.775 m
Z -9.675 m
Grid 5 m
Selected Item Camera

Figure 4: Screenshot of ArrowStrip object bent by the use of bones. At left is the wireframe model, center is the same model with texture maps enabled, and at right is a rendered version used as a background image.

Further Texturing Tricks

Here are a few quick notes on making the arrow surface:

- If the object is being twisted so much that the underside is seen by the camera, you should make the surface double sided.

- The white arrow on black background image can be applied to several attributes simultaneously: specularity, diffusion, color, bump, luminosity, even reflection.

- When you apply the arrow image to transparency or for a clip map, don't forget to activate the negative image function.

- Clip mapping renders much faster than transparency mapping. However, you may want to set the opacity of the clip map to between 55% and 60% so that it only removes the blackest part of the arrow map, rather than halfway through the grayscale gradient used for antialiasing.

- When you apply the arrow map to several attributes, don't forget to assign the velocity setting to each attribute as well. Otherwise, the maps will only line up on the first frame!

- You can avoid map synchronizing problems by using a reference object instead of a velocity value. Reference all the mapped attributes to the same reference object, then keyframe the reference object to move at the same rate as the map velocity. This also enables you to stop, reverse, and vary the speed of the arrows during an animation.

- Feel free to create your own arrows; there is certainly enough precedent for variation in graphic design. In fact, it's not even necessary for the graphic to be an arrow. It could just as easily be boxes of popcorn, dollar signs or lemmings traveling down the path.

Whatever the job calls for, LightWave once again is there to make it happen.

Gallery

Image by Rory McLeish
Email: Rory.McLeish@team17.com

Image created in LightWave, surfaces and textures created in Photoshop.

Pondforest created by Eric Holbrook
E-Mail: wirewolf@bestweb.net

Created in LightWave 5.6 using TreeDruid

Cannibal by Alberto Pizzetti
E-Mail: piz@chiavari.newnetworks.it

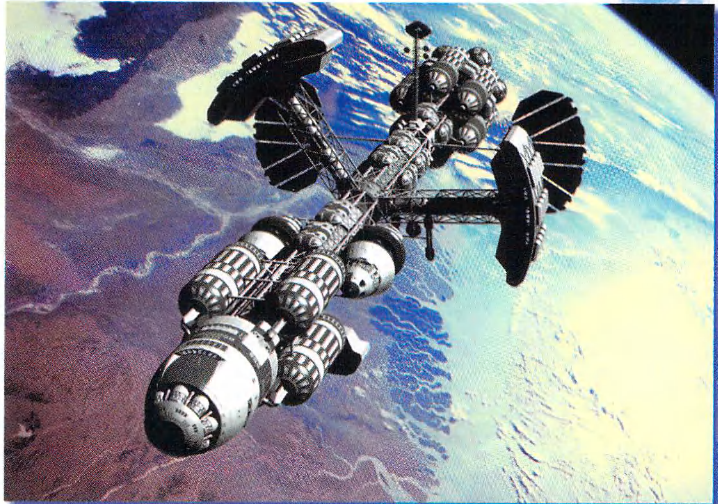
I use LightWave because MetaNurbs and the other tools are ideal instruments for generating organic life-forms. I used only Lightwave 5.5 for the modeling and rendering, and Photoshop 4.0 for drawing textures and bumpmaps. Rendering took about 1 hour on a Pentium 120/64Mb.

I modeled my creature with Modeler using a backdrop image. For textures I rendered some reference pictures.

Cannibal courtesy of the LW Mailing List Contest. www.tv3d.com

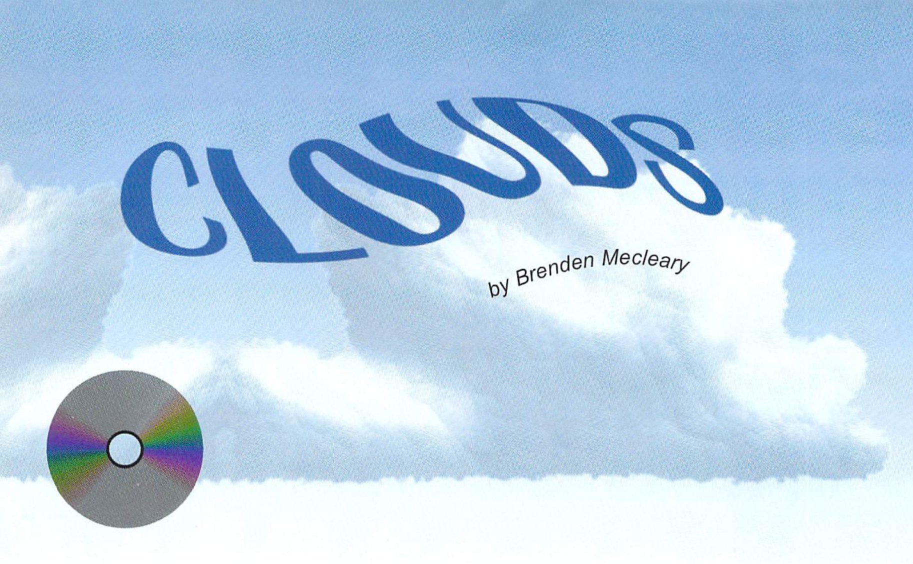
Image by Rory McLeish
Email: Rory.McLeish@team17.com

Image created in LightWave, surfaces and textures created in Photoshop.



CLOUDS

by Brenden Mecleary



This tutorial is a quick run-through of how to make images of clouds to use as image maps in your LightWave scene. I've found that, aside from purchasing a stock photography CD or taking photographs yourself, it can be difficult to get usable images of clouds. Even with photographs, you still have the problem of making an alpha mask if you want to map them on to an object (as you'll do in this tutorial). What I present here is a (mostly) painless method of making cloud images that is also LightWave-friendly.

Setting Up the Scene

Start by creating a flat plane in Modeler, 10 meters long on the X and Y axes. Click X to activate the box tool, then n to bring up the numeric requester. Set the Low values to [-5, -5, 0] and the High values to [5, 5, 0]. Leave Segments set to 1 on all three axes. Click OK; then press Enter to make the box. Change the surface name on this box to "Cloud texture" by pressing q, typing in the new name, then clicking Apply. Now, save the object (shift-s) as "cloud texture.lwo." From the File menu, choose Clear, and click OK. Make another polygon just like the last one, but use Low and High values of [-3, -2, 0] and [3, 2, 0]. Set its surface name to "Cloud" and save it as "Cloud.lwo."

Open Layout and load cloud texture.lwo into the scene. From the Add drop-down list, choose Load Object File, then select cloud texture.lwo and click Open. From the view selection list, choose Camera View. In frame 0, position the camera so that the polygon fills the entire viewport, and set a keyframe.

Next, surface the cloud polygon. Click the Surfaces button to open the Surfaces panel, and select Cloud texture from the Current Surface drop-down list. Open the bump map requester for this surface by clicking the T button next to Bump Map. For Texture Type, choose Crumple. Set the texture size to [2, 2, 2], the texture amplitude to -60%, scales to 5, and small power to 0.85. Click Use Texture. Close the Surfaces panel. Open the Objects panel, and choose Save Object to preserve these changes. Close the Objects panel.

Now you're ready to render the image. Click Render, and set both Render First Frame and Render Last Frame to 1. Turn on Automatic Frame Advance, too. From the RGB Image Format pull-down, choose 24-bit Targa. Click Save RGB Images and type "ct", then select Save. Finally, check that the Output Filename Format is Name0001.xxx. Click Begin Rendering, and let the image render.

Once the image has rendered, close LightWave and start Photoshop. (Note: You may, of course, use an image-editing program other than Photoshop for this, but the instructions here use Photoshop features, so you'll have to find the equivalents in your software.)

Creating the Cloud Image

Open file ct0001.tga and mask off an area to define the shape of your cloud. There are two primary ways to do this. The easiest is to use the lasso or polygon selection tool to draw it. A better way is to paint your cloud's shape in Quick Mask mode, and that is what I will discuss here. Enter Quick Mask mode, and switch to the airbrush tool. Use a fairly large brush to start with. 100 is a good size, though you can switch to a smaller brush to add detail later on. Set the brush mode to Dissolve. Now, paint your cloud shape, using whatever color (typically white) means "selected."

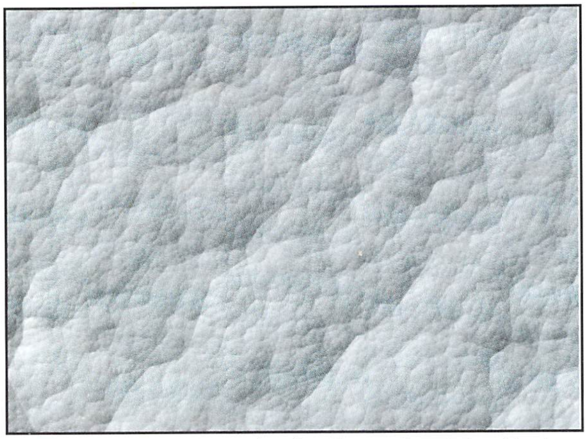


Figure 1: File ct0001.tga showing the rendered cloud texture.

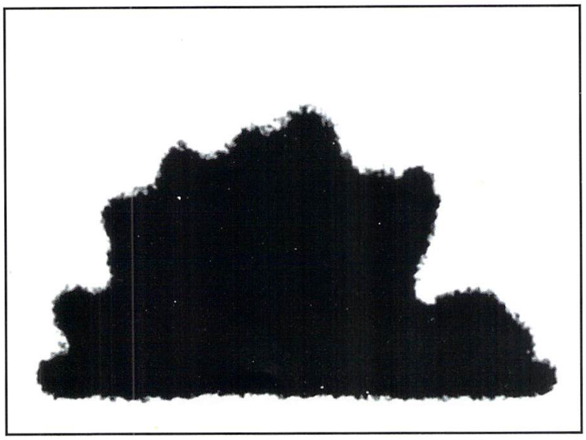


Figure 2: File cloud_alpha.tga showing the alpha channel mask for the cloud area.

Your cloud should have a mostly flat bottom, but billow up at the top. Use smaller brushes to add protrusions off the sides if you want. Before switching out of Quick Mask mode, apply Gaussian Blur from the Filters menu. Set the blur's radius to 2, and click OK. Now, open the Brightness/Contrast panel and turn the contrast up to +80. Click OK. You will use this channel as the alpha channel within LightWave, as well as the mask for editing in Photoshop. Select the mask and copy it into a new image. This will give you a grayscale depiction of your mask. The cloud area should be black and everything else should be white. Invert the image if necessary. Save this as "cloud_alpha.tga"

Switch Photoshop back to regular mode. You now have your basic cloud shape selected. First of all, invert the selection and fill that area with solid (255) white. Invert the selection again to edit your cloud. As you can see, it looks very flat right now. Use the dodge and burn tools to add shading to your cloud. This part is very subjective, so all I can say is to shade based on the light you expect to have in the scene. A very beautiful effect is when a light source is behind the clouds, such as at sunset or at night. When this happens, the light diffuses only through the edges of the cloud. The thicker interior of the cloud absorbs all the light, as in Figure 3a and b.

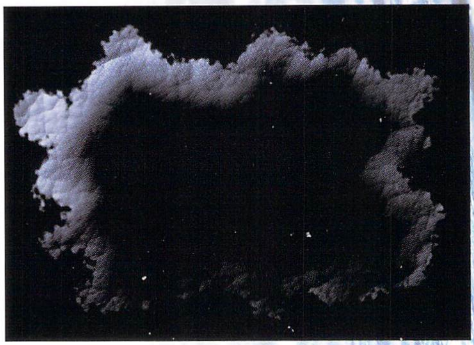


Figure 3a - Backlit cloud

You should also use the Hue/Saturation panel to tint your clouds: faint blue during the day, pink/orange at sunset or sunrise, moonlight blue at night, and so on. After you've finished editing your cloud image, save it as "cloud.tga." (Figure 4)

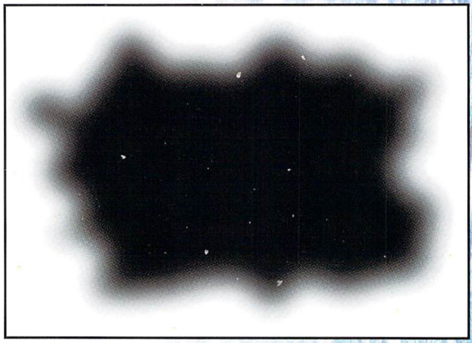


Figure 3a - Backlit cloud's Alpha channel

If the rather sharp creases of the Crumple texture are not exactly the effect you want, you might experiment with another pass of Gaussian Blur. This can create softer, more natural transitions in the cloud's texture.

Finishing Up

Now, open Layout again and load these images by clicking the Images button to open the Images panel; then click Load Image. Select cloud.tga and click Open. Repeat these steps to load cloud_alpha.tga.

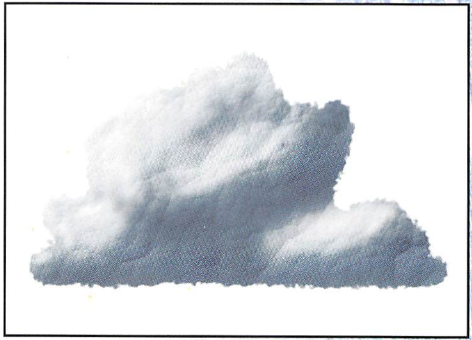


Figure 4 - File cloud.tga

Once you have loaded the images, load cloud.lwo and apply the images to its surface. Click the Surfaces button to open the Surfaces panel, then select the Cloud surface. Open the color texture map dialog box. For Texture Image, choose cloud.tga. The texture type should default to Planar Image Map, so all you need to do is disable Texture Antialiasing and size the texture to the object. Click Automatic Sizing, and choose Yes when it asks you whether to proceed. Click Use Texture. Repeat these steps for the transparency texture on this surface, but use cloud_alpha.tga as the texture image. Set the diffuse value of this surface to 0%, and the luminosity to 100%. You can change the luminosity to make your cloud darker or brighter. If you need to reduce the contrast on the cloud, drop the texture opacity of the color texture.

Render the image…and there's your cloud! (Figure 5) You can repeat this process for as many different cloud shapes as you need, and you can probably even get away with using the same texture image for many, if not all, of them. This issue's CD-ROM contains a few sample cloud images for you to try out, as well as a scene that demonstrates one of the cloud objects in use.

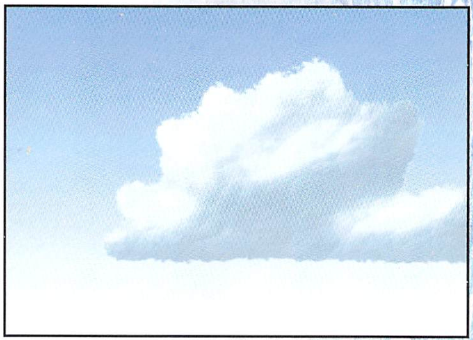


Figure 5 - Rendered cloud

Clouds are among the most beautiful of nature's displays, and they can add a sense of drama and splendor to your scenes that is hard to find anywhere else, so use them well!

Brenden Mecleary is a software developer at a San Diego cellular phone company, and a LightWave plug-in author. In his spare time, he plays computer games and works on RealiTools 2.0. You can e-mail him at bman2@ix.netcom.com.

Let it Snow

by Brad Herman

This tutorial was inspired by a real problem sent to the LightWave mailing list: how to create snow falling and settling into the grass pictured in a background plate.

Let's start by making a new ground object. We need a ground plane that is 10 meters wide and 8 meters deep. Open Modeler. Select the Make Box tool. Drag the mouse or use the Numeric panel to make a rectangle, 10 meters on the X axis, 8 meters on the Z, and zero on the Y. Press Enter to create the polygon. Make sure the polygon is facing Y+ by selecting the polygon and checking that the face indicator is pointing up. If the indicator is pointed down, use the f key to flip it so it looks like Figure 1. In the Surfaces panel, name the surface of this polygon "Ground."

Next, create the grass, an array of two-point polygons that fits the Ground polygon. Start by creating a single blade of grass. Go to a new layer in Modeler. Make the Ground polygon layer visible in the background, then select the Polygon/points function. Create two points, one at 0,0,0 and the other at 0,100mm,0. You should have one point just above the other. Select both points, then hit the p key to make a polygon. Name the surface of the two-point polygon "Grass."

Now multiply, move, and trim the grass. In the Multiply menu, use the Array function with dimensions of X=75, Y=1, Z=75 and jitter of X=200 mm, Y=0, Z=200mm. Set a manual offset of X=135mm, Y=1m, Z=110mm. Move the resulting grass object to cover the ground polygon in the background layer. Your results should be a nice bit of turf like Figure 2. Trim away any of the two-point polygons that are outside the Ground polygon in the background. Copy the grass object, then paste it onto the ground polygon. Save this object as grass.lwo. Close Modeler.

Laying Out The Scene

Start up Layout and load grass.lwo. In the Images panel, load the bg-plate.jpg image included on this issue's CD-ROM. If you don't have it, any image with a level piece of grass will do. In the Effects panel's Compositing tab, set the background image to bg-plate.jpg. If you have a slow graphics card, your system may take a little while to redraw the scene.

Here's a tricky part. By moving and rotating only the Camera, line up the Grass object to match the grass in the background image. Your results may vary, but in my scene the Camera ended up at Position X=-4.4m, Y=4.325m, Z=-22.1m and Rotation H=18.4, P=-2.2, B=-7.4. Once you have your camera in the

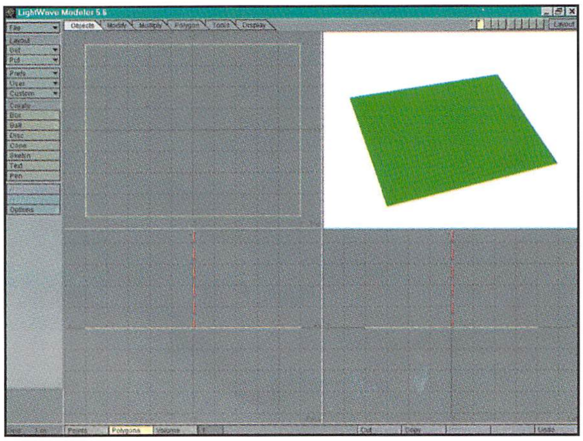


Figure 1: Ground plane object, with surface normal facing up.

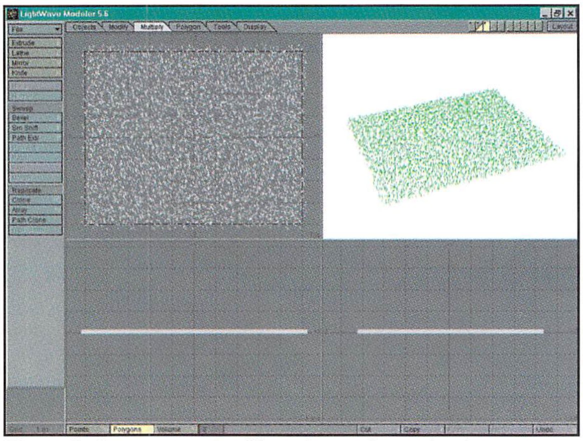


Figure 2: Grass array positioned over Ground polygon.

correct spot, move and scale the Grass object a bit. Since we want it to snow most of the way across the frame, stretch the grass a bit. For my scene, I scaled the X axis by 2.032 and the Z by 2.35m. I also pushed it back 4.054m and to the right 3m. You should end up with something like Figure 3 on the next page.

Setting Up Surfaces

The next step is to surface the Grass object. First the Grass surface. In the Surfaces panel, select the surface color texture button. Choose Front Projection Image Map, and set the texture image to the background plate. Use the Texture panel to make a surface preview. This will not show an accurate preview of a surface using front projection mapping, but we can use it to copy the settings onto the Ground surface. Choose the Ground surface, then click on the sphere in the surface preview to copy the preview's values. Click Use Surface, then make a test render. You will see that the grass mostly blends into the background, but there are some obvious blemishes.

There are two ways to fix these artifacts. Which solution you choose depends on whether or not you want your snow to cast a shadow. Having lived on the east coast for the first 17 years of my life, I have seen a bit of the white stuff, and it usually does not cast a shadow. Why? Well, it is generally overcast when it snows. That cloud layer diffuses all the light so there are only soft shadows from large objects, and the tiny snow does not cast enough of a shadow to be seen. If you want shadowless snow, all you have to do is set the surface Luminosity to 100 and Diffuse to 0. However, since our image is a sunny day, we are going to have our snow cast a soft shadow. Set the Grass surface to Luminosity 95% and Diffuse to 5%. Set the Ground surface to Luminosity 60% and Diffuse 40%.

Setting Up The Light

In this scene, we will use a single distant light source to duplicate the illumination of a sunny day. The luminosity and diffuse values of the surfaces add up to 100%. With the light source set at 100% and pointing full force at our surfaces, the objects in our scene should blend with the background plate.

Position the light at X=-7.8m, Y=18.875m, and Z=8.8m, with a Heading of 150.5 and Pitch of 50.7. A test render should show only your background image with no visible artifacts, as in Figure 4. You can now turn off the Options Panel|Layout View|BG Image, so your screen redraw will be faster.

Let It Snow, Let It Snow, Let It Snow…

Now you are ready to create the snowfall, using the particle animation plug-in Particle Storm Lite included with LightWave. Choose ParticleStormLite from the Generic Plug-in List. In the opening screen, parent the Particle Storm camera to the Layout Camera, so the Particle Storm screen duplicates the camera view in Layout. Open the Particle Group panel and turn off Recycle Particles, Particle Shader, and Death Wish. Change the Name from PSGROUP to Snow. Click the Create Object Now button to create the particle object we will be loading into Layout.

Go to the Collision Detection panel to create a collision instance that mimics the scene's Ground object. Click Create, then select Snow as the Affected Particles. Set the position of the collision object to X=3m, Y=-.5m, Z=4.054m and a Size of X=10, Y =0.5 and Z=8.

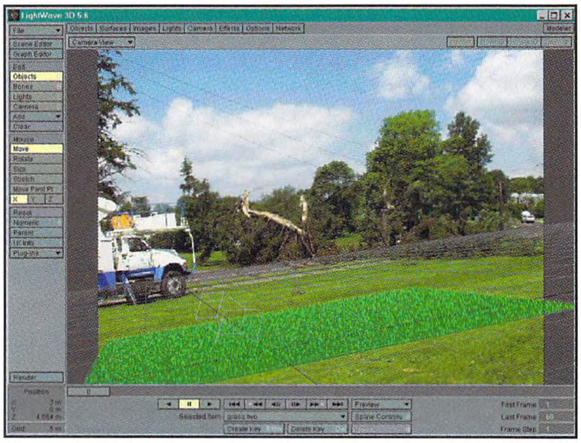


Figure 3: Camera positioned and rotated to match background plate, and Grass object scaled and positioned.

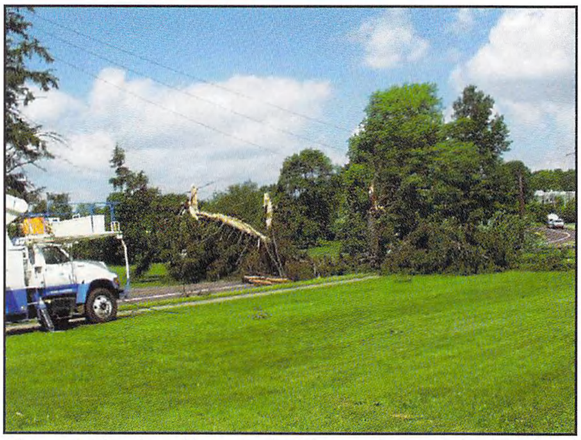


Figure 4: Rendered image, showing perfect match of light and surfaces.

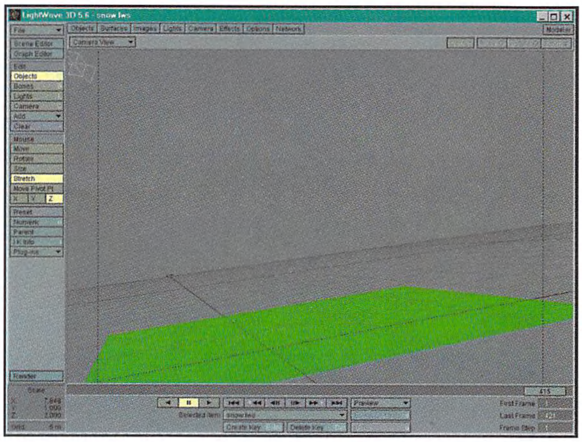


Figure 5: Snow.lwo positioned and scaled.

Now that we have some ground to hit, let's set up the Fountain Emitter. Open the Fountain Emitter panel. Set the Birth rate to 100 and the min and max Spread to zero. Set the Position to X=2.4m, Y=16m, Z=3.98 and change the Pitch to 90 degrees. Change the size to X=8m, Y=6m, and Z=3m. You can leave the speed of the particles at the default min 1m/s and max 2m/s. Press the Project button and set the output path to the same place you saved the Grass object. Set the stop frame to 450, then save the project.

Hit the play button. You should see the particles dropping out of the air and bouncing off the collision object. Real snow does not bounce, so go back to the Collision settings. Set Elasticity to zero

so the particles stay where they land. (We could have turned off the Elasticity earlier, but it's fun to watch them bounce). If the particles seem to be falling a bit too slowly, you can turn on Gravity. You should reduce Gravity's strength to 1 m/s or so to keep the snow from falling too quickly. When the falling action looks good in the preview window, click the record button to create the PSM file. Close the ParticleStormLite panel.

Putting It All Together

In Layout, open the Objects panel and load the new Snow object. Under displacement plug-ins, choose Particle Storm. Open the Options panel for Particle Storm, then load the PSM file you just recorded. Close the Options panel, then the Objects panel. Drag the Layout frame slider, and look at the Snow particles. You should see that the particles are falling right, but they need to be scaled and moved a bit. Set the Snow object's position to X=-18.0193m, Y=5cm, Z=-4m, set the Scale to X=7.848, Y=1.0, Z= 2.0, as in Figure 5 on the previous page.

Now you need to play a little with the appearance of the particles. In the Surfaces panel, select the Snow surface. Change the color surface from the default yellow to snow white. Under Advanced Options, remove the Particle Storm shading plug-in. Now the particles will behave exactly like any other single-point polygons. If you make some test renders, you will see the particles falling and landing in the grass as in Figure 6. You can change the size of your snowflakes by going into the Objects panel's Appearance Options tab and selecting the Particle/Line Size of the Snow object. Also, adding a little bit of Glow Effect (from the Surfaces panel) helps give the particles some fluffiness.

Going Further With HyperVoxels

You can use one of LightWave 5.6's new features, HyperVoxels, to create a better look for the snow. First, save your scene as snow.lws. In the Objects panel list of Displacement plug-ins for the Snow object, add HyperVoxels Particles below the Particle Storm plug-in. In the Pixel Filters plug-ins area of the Image Processing tab of the Effects panel, add HyperVoxels, then HyperVoxels Doubler below it. Open the Options panel for HyperVoxels and activate the Snow object. Make sure that Enable HyperVoxels and Render 1/2 Res are checked. Set the Sizing Mode to Absolute, set Particle Size to .3, and Size Variation to 15%. Now change the surface color to white, Luminosity to 90% and Diffuse to 5%. In the Advanced Parameters panel, turn on Shadows and set Strength to 85%. Close all the panels and return to Layout. Make a test rendering. If your snow looks OK, go on to the next step; otherwise, go back and tweak HyperVoxels to your liking.

The last step is to return to Layout and apply the HyperVoxels Shader plug-in to the Ground surface. Set it to receive shadows at 90% strength. Put the same shader on the Grass surface, and since this is a shader you do not need to have Trace Shadows turned on. Render a frame and you should get something like Figure 7.

Now you have falling snow. From here, you're on your own to experiment and try cool variations on this theme. Just to get you started, here are a few ideas off the top of my head. Try using the Gradient on the Color, Transparency or even the Size to make the snow pile up more. The Y axis distance is a great gradient to use. Try using the Cel shader with Cel Edges turned off. Want to make it rain? Play with transparency and refraction. You can even make a Hypervoxel puddle reflect the real scene!

Brad Herman works as a freelance 3D Modeler and Animator based in San Francisco. He is currently working on the game Prince of Persia 3D *at Red Orb Entertainment. You can contact Brad at www.slip.net/~techno/ ; techno@slip.net ; 415-292-3461*

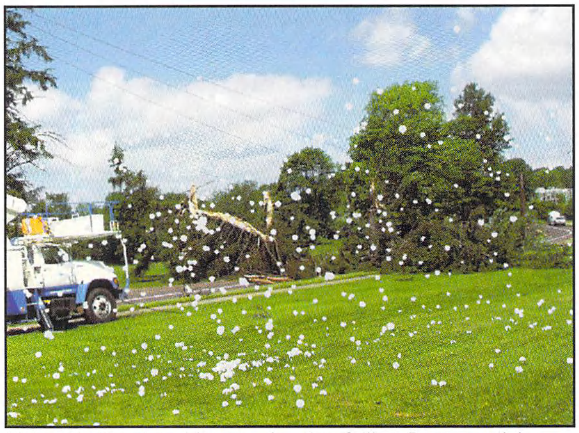


Figure 6: Rendered image showing falling Snow particles.

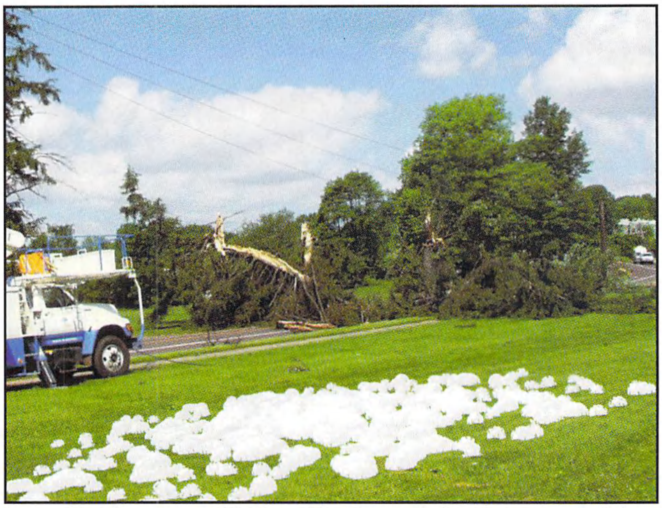


Image 7 - The scene with HyperVoxels applied to the snow particles.

Still Ssssmokin'...

by Anupam Das

Hello and welcome back to Ssssmokin!In issue #8, we surfaced and modeled an object to make it look like a smoke plume. However, the object was static except for the animated noise that we applied to it. Now we will actually animate the smoke plume.

I created this tutorial using LightWave 5.6 running on an Intergraph TdZ 2000-GL2. All objects, scenes and textures referred to in this tutorial are located on the Keyframe CD-ROM in the directory Tutorials/Smokin/.

Let's prepare for launch. We will start where we left off, so load rocketexhaust.lws. This contains the surfacing and geometry without animation; we will add the animation soon. Look around the scene. Make a wireframe preview. Note how only the fractal displacement map is animating downward, giving the illusion of flowing exhaust.

Open the Objects panel and select exhaust_test.lwo. Note that the object has a displacement map applied to it. Open the displacement map Texture panel for the object. In last issue's tutorial, we applied two displacement map textures. One is a Fractal Bump for the smaller balls, and the other is the plumes2.jpg Cylindrical Image Map (referenced to the NULL1 null object) for the larger secondary plumes. The exhaust object should already have these attributes applied to it. Close the Texture panel.

Close the Objects panel and move the Camera back a little to get a good view of the entire object. Don't forget to make a key at frame zero for the Camera, or LightWave will not remember you moved it.

Now we are ready to animate the exhaust in an upward direction like a standard Space Shuttle launch. At first, this seems like a simple task, but we cannot simply move the exhaust object straight up with the rocket. That would look unnatural. Instead, we will use a chain of Bones to animate the exhaust. This way, we will have more control over the shape of the smoke plume the rocket leaves behind.

Add the first Bone. Go into Edit Objects mode [Shift O], and select the exhaust_test.lwo object. Go into Bones mode [Shift B], and then open the Bones panel [p]. Click on Add Bone. LightWave adds a new Bone with the default name of Bone(1). Set Bone(1)'s rest length to 10m. Turn on Limited Range, with a minimum range of 0m and a maximum range of 5m. Limited Range defines the area of influence for the Bone.

I realize that some of you may not be familiar with the effects of all the Bone parameters. If you are having trouble understanding how Bones work, the LightWave manuals provide an excellent reference. It does help to review the manuals sometimes!

Click on Rest Direction, then set Heading=0, Pitch=90, Bank=0. This represents the Bone's orientation at rest. Any rotation of Bone(1) away from these angles will make the Bone deform the exhaust_test.lwo object. Close the Bones panel and go back into Layout. You will find the Bone at the origin slightly ghosted out. This is because the Bone is not active yet. It does not deform the exhaust object when you move it around.

While you are still in Edit Bones mode, move the Bone to X=-20cm,

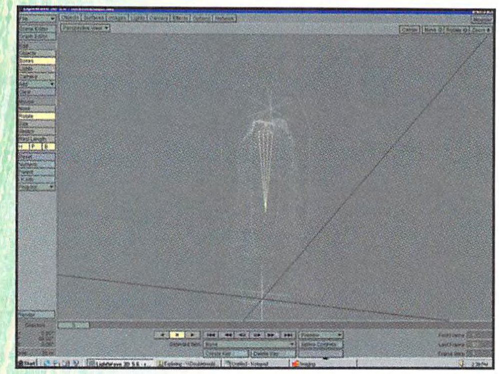


Figure 1: Limited Range set for Bone(1) in exhaust_test.lwo.

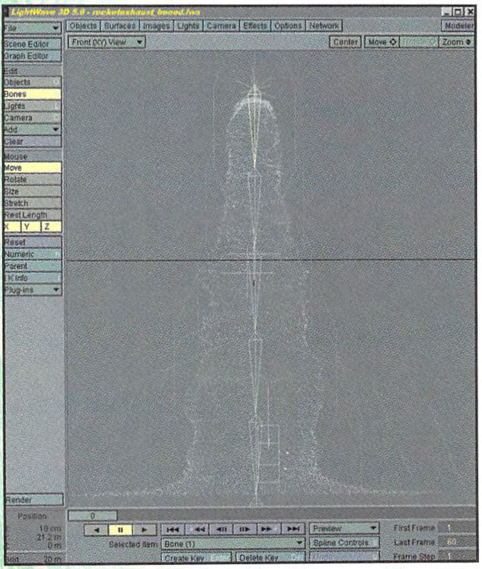


Figure 2: Chain of seven Bones set up in exhaust_test.lwo.

Y=19.2m, Z=60cm. Set Heading=0, Pitch=90, and Bank=0. Click Create Key [Enter] to create a key at frame zero for the Bone. The Bone should be at the tip of the rocket's exhaust, and pointing in the direction of the plume. Press [r] to activate the Bone. If the Bone is moved, it will now deform the exhaust object. You will also note a dotted ellipse around the Bone; this represents the Limited Range that we set up. The limited range will ensure that the Bone will affect only geometry falling within this area of influence. (Figure 1)

Rather than just using one Bone, we will use a chain of Bones to provide more control for animating the exhaust plume. Creating the chain is easy. Select Bone(1). Press the [=] key. You will note that this creates a child Bone positioned head to tail with Bone(1). Repeat this procedure until you have a total of seven Bones. In Front view, your setup should look like Figure.2.

Select Bone(1) and open the Bones panel [Shift p]. Scroll through all the Bones using the Current Bone selector. Note that all the Bones retain the same settings that we created for the first Bone. To give a more natural falloff effect, we will adjust the limited ranges for all the Bones. At the tip of the exhaust, where it is narrow, we want a smaller limited range. At the base of the exhaust, where it is wider, we want a larger limited range. Select Bone(2). Set its limited range to Min=0m, Max=6m, and so on for: Bone(3):0m -> 7m, Bone(4):0m -> 10m, Bone(5):0m -> 13m, Bone(6):0m -> 20m, Bone(7):0m -> 30m.

I have to be honest; there is no scientific way of choosing these settings. I started with some values that made sense to me, then rotated and moved the Bones around in Layout to see the Bone's effect on the geometry, and then tweaked the falloff settings some more to make it look the way I wanted it. There is no substitute for tweaking!

The scene rocketexhaust_boned.lws contains all of our modifications so far. Now comes the fun part: animating! Again, there was a lot of trial and error here and an eye for timing definitely helps the process. It might also help you to have rocketexhaust_Boned_animated.lws loaded when going through this.

Select the topmost Bone, Bone(1). Go to frame 20 and move the Bone up in the Y-axis. I chose Y=60m. Don't forget to create a key. Now go to frame 60, move the Bone up a little more and create a key. Make a preview. Note that the exhaust trail may seem a little skinny as it gets longer. To prevent this, I scaled some of the Bones along the hierarchy at random intervals. You can scale Bones just as you scale any object: select the Bone, then click on Size. Note that when you change the size of a Bone, its children also resize along with it. Therefore, you might need to readjust the child Bones as well.

Continued on page 23

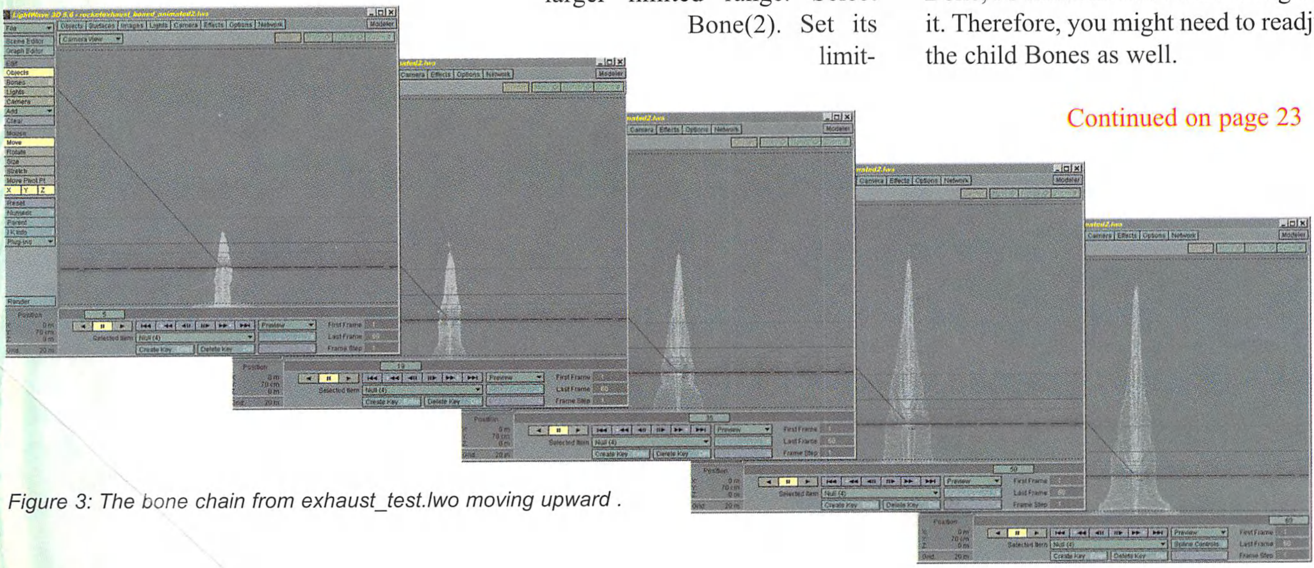


Figure 3: The bone chain from exhaust_test.lwo moving upward .

Cover CD Table of Contents

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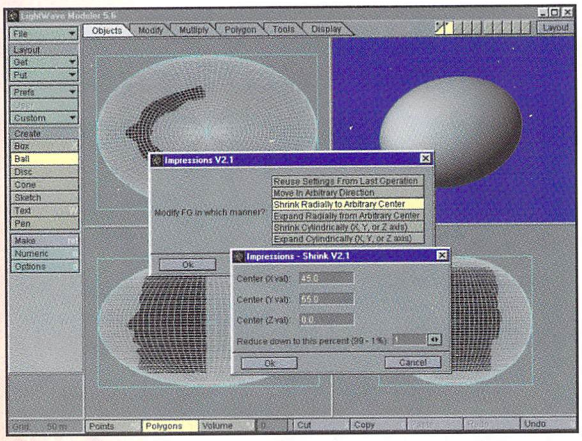
Impressions
Life Forms 3
Polk Collection

Impressions

Reviewed by Doug Kelly

Dave Hudek has written yet another utility plug-in that many LightWave users will find valuable. Impressions 2.1 is a Modeler plug-in that shrink-wraps selected foreground points to fit the geometry of background object(s). This is a tool that can save you hours, dollars and sanity if you ever need to simplify complex models.

Using Impressions is quick and simple. You first load an object or collection of objects into a background layer, then load or create an object in the foreground layer. You can select a subset of points to deform, or deform the whole foreground object, using LightWave's standard selection tools. From the Impressions panel, you can choose to adapt the selected object in one direction (like Planar projection), or to expand or shrink the object spherically or cylindrically.


LightWave Modeler 5.6
File
Layout
Get
Put
Prefs
User
Custom
Create
Box
Ball
Disc
Cone
Sketch
Text
Pen
Make
Numeric
Options
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Impressions V2.1
Reuse Settings From Last Operation
Move In Arbitrary Direction
Shrink Radially to Arbitrary Center
Expand Radially from Arbitrary Center
Shrink Cylindrically (X, Y, or Z axis)
Expand Cylindrically (X, Y, or Z axis)
Ok
Impressions - Shrink V2.1
Ok
Cancel
Grid 50 m
Points
Polygons
Volume
Cut
Copy
Paste
Redo
Undo

Modify FG in which manner? Shrink Radially to Arbitrary Center

Center (X val): 45.0

Center (Y val): 55.0

Center (Z val): 0.0

Reduce down to this percent (99 - 1%): 1

Figure 1: Impressions set up to Radially shrink ball object to fit Cyberscan head

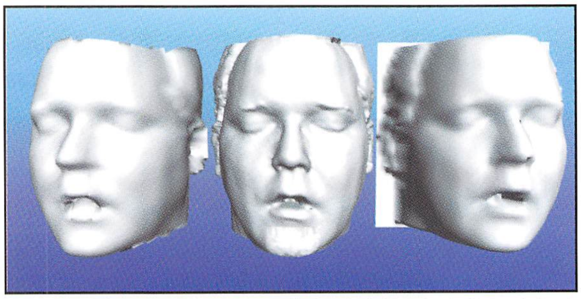


Figure 2: Impressions Radial shrink at left, original Cyberscan head center, X-Axis shrink at right.

As a test, I loaded a partial Cyberscan of my head into the background. This object is just under 50,000 polygons, and is far too heavy to animate. I then created a 50x100 ball object in the foreground. This is a fine enough mesh to catch most of the facial details on one pass. I selected Shrink Radially to Arbitrary Center, then set the center to the center of the ball object as shown in Figure 1.

After less than a minute of processing, the sphere ended up as shown at left in Figure 2. After trimming away the back polygons, the new object had fewer than 2300 polygons. For comparison, I repeated the operation with a flat plane and a one-direction shrink in the X axis. This resulted in something like a Vacu-Form, as shown at right in Figure 2. Without trimming, this object had 2500 polygons.

To get some idea of how Impressions moves each point during the deformation process, you can refer to the two AVI clips in the Impress directory of the CD-ROM. These are simple morph sequences between the original object and the Impressions deformation.

These are the results of a single operation. If I were actually going for highest detail and lowest complexity, I'd create a much simpler mesh, then manually realign each point before executing Impressions on it. I think I could get a recognizable and animatable version of the Cyberscan with a few hundred polygons. If I were creating a MetaMation cage object, I could probably get it well under a hundred. This is a pretty handy tool!

I highly recommend Sergio Rosas' online Impressions tutorial, at http://www.throb.net/serg/tuts/Tutorial1.htm, for an interesting application to NURBS modeling. Sergio points out that you can use any tool you like to create a complex object, then use Impressions to deform a clean, NURBS-compatible surface to match it.

The Impressions package is small and easy to download and install. No frills here; the plug-in and a readme file is all you get. However, the eight-page documentation is concise, reasonably complete, and better than I've seen in software costing many times the price.

The hints in the readme file are an excellent starting point for improving your results, working more efficiently, and having fun. This plug-in easily creates morph targets of any object into any other object, making it lots of fun to play with your object collection.

From my own bias for character animation, I can think of at least one invaluable use for Impressions. If you have put a lot of time into a library of facial expressions based on a MetaMation cage object, you don't want to repeat all that effort for every new face you build. Using Impressions, you can use any tool you like - digitizer, laser scanner, photogrammetry, whatever - to build a detailed new face, then shrink-wrap the old face cage to the new face object. If a point doesn't land quite where you want it, select and drag it out a bit, then shrink it again. As long as you build your faces with similar basic structures, you should be able to Impression your original face onto any new one.

The shareware policy is reasonable. If your work includes extracting NURBS from complex polygonal models, importing geometry from other programs, or almost any modeling relating to character animation, the full version is a good value at $50. The demo version is also on this issue's CD-ROM.

For details, downloads and registration: Dave Hudek, Hudeks@AOL.COM, www.ultranet.com/~dhudek/graphics/lw/

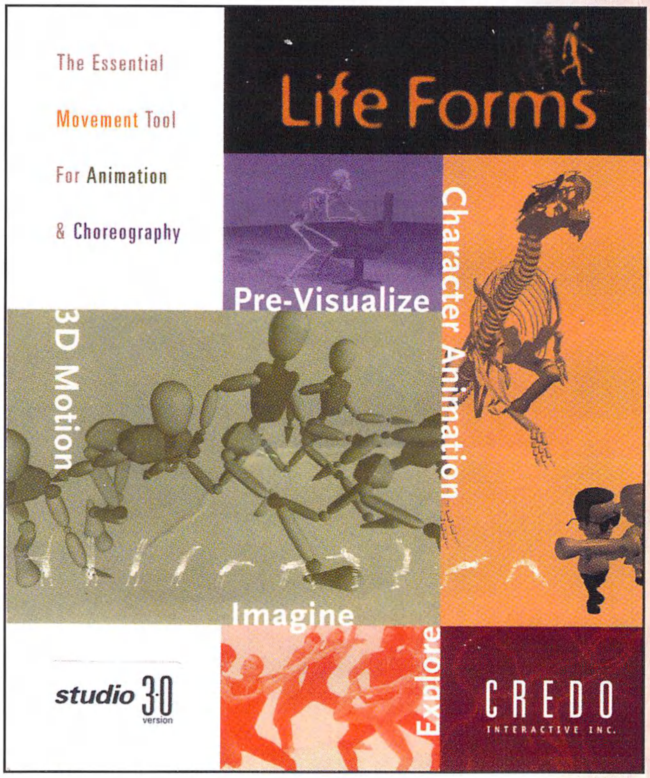
Life Forms 3

Reviewed by Doug Kelly

Life Forms 3 is a stand-alone program designed to edit and manipulate skeletal poses and animations. It works with LightWave by importing and exporting compatible scene and object files via plug-in DLLs. Life Forms seems to be an appropriate tool for pre-visualization, choreography, simple forensic animation, and limited animation of realistic human models, especially for entertainment products based on motion capture. Life Forms is definitely not an appropriate tool for non-humanoid or caricatured character animation, and may fall short of the mark for top-end mocap work as well.

Life Forms is a simple, direct program that enables the user to quickly apply motion capture (using BioVision or Acclaim formats) or a library of poses to standard humanoid models. It's a lot like MetaCreations' Poser in this respect; if all you need is a human figure that moves smoothly between realistic poses, this is a quick, inexpensive, and easy way to do it. If you are a choreographer planning a new dance or a director doing previz for a film shoot, you can probably get your money's worth out of Life Forms.

However, Life Forms misses the high bar in several crucial areas. First, this program does not enable the user to edit keyframes for a subset of the skeleton. Each keyframe contains keys for every joint, creating an overly complex and difficult-to-edit scene. This also makes it difficult to add overlapping action, a basic principle of character animation.



Second, Life Forms has no equivalent to LightWave's Scene Editor or Motion Graph. The Timeline view simply shows the whole figure's key pose (Keyshape) at each keyframe. Users have no feedback as to the timing or extremes of any subset of the action; it's all or nothing.

Third, the Thin Keyframes function simply deletes keyframes without salvaging important extremes or other critical data. It's the equivalent of LightWave's Delete Key For All Items function. And because of the limited Timeline view, you'll never know what you missed.

Fourth, Life Forms has no solution to that bugaboo of mocap, floor float. If you want to keep your characters from penetrating or floating over the floor, you'll still have to use Lock & Key to nail their feet down. Most of the demo files included with Life Forms show a painful amount of floor float, as you can see in the animations included on this issue's CD-ROM.

Fifth, the program scales all poses according to the height of the skeleton. Life Forms makes no provision for differences in proportion. If your skeleton has long legs and a short torso and arms, you'd better hope the mocap data wasn't captured from Dick Butkus. This problem with body proportions is the primary reason mocap data applied to non-human characters always looks like an actor in a rubber suit. If mocap is going to be usable, you have to capture from an actor with the same proportions as the final skeleton.

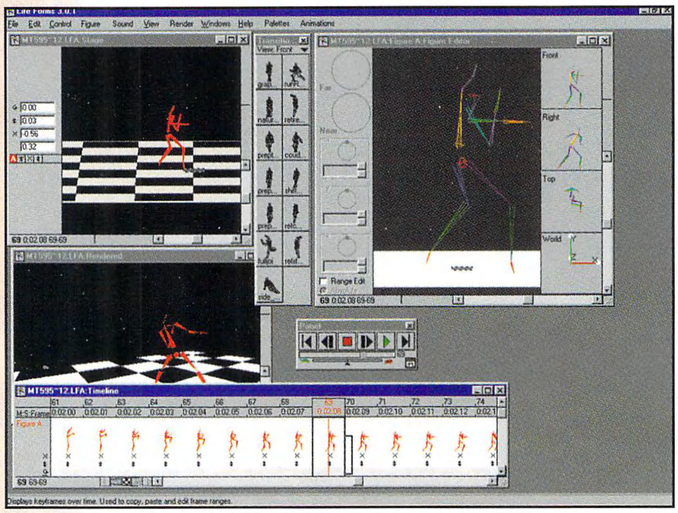
On the positive side, Life Forms includes scripting functions so you can automate processes. This is a real timesaver in a production environment. The program also has a handful of unique and useful features like Mirror Joint Positions (to make characters bilaterally symmetric), Merge Scene File, and Blend Keyshape.

The package includes a CD-ROM, a thorough and readable 362-page User Guide, and a similarly well-written 132-page manual entitled Working With Other Programs. The Guide is nearly an inch thick, which can cause a perfect-bound paperback to become unwieldy or fall apart. Credo's choice of spiral bindings enables you to leave either manual open flat (or even doubled back) so you can read hands-free while working. This is a thoughtful touch that I wish more software publishers would consider. Both manuals have excellent, detailed tables of contents, and the User Guide has a comprehensive index. If you buy this product and don't read the documentation cover-to-cover, you will be cheating yourself.

The documentation for Life Forms' LightWave export plug-in is brief but adequate, and you can download the current PDF files from the Credo website. At the time of the 1.0.5 release the lightwave_general.pdf was only 15 pages, but Ed Konyha of Brainchild Studios has written a good tutorial on using Life Forms with Puppet Master, puppetmaster_tut.pdf.

This tutorial is especially valuable for pointing out a potentially major compatibility problem with Life Forms and LightWave character animation. For a variety of good reasons, most character modelers create their figures in the leonardo or jesus positions, with arms held straight out, palms down. However, default or calibration poses for motion capture usually pose the actor with arms down. Credo warns that if you map joint rotations from the mocap pose to the leonardo pose, you will lose some data. They "highly recommend" that you build your characters with the arms lowered. This may not be a significant problem for new characters, but what about the libraries of available models (including those from Viewpoint and other vendors) built in the de facto standard pose?

Basically, if you already use LightWave, you will not have much use for 80% or more of Life Forms' features. For the same price, you would be better off buying Cine-Graphics' KeyPro, which has most of the same editing, blending and preview functions and integrates more smoothly with LightWave.


Life Forms 3.0.1
File Edit Control Figure Sound View Render Windows Help Palettes Animations
MT595^12.LFA:Stage
MT595^12.LFA:Figure A Figure Editor
MT595^12.LFA:Rendered
MT595^12.LFA:Timeline
Front
Right
Top
World
Range Edit
Displays keyframes over time. Used to copy, paste and edit frame ranges.

Life Forms 3 screen shot

If you do not yet own LightWave, Life Forms may be a quick and relatively easy way for you to combine mocap data with keyframe poses to create simple animations. However, it doesn't have the power tools you need to efficiently edit mocap data for production work, and it doesn't have essential character animation tools, either. That makes Life Forms an entry-level tool at best, but that may be just what you need.

You can download the Life Forms 3 export DLLs for LightWave from: ftp.credo-interactive.com/pub/plug-ins/win/lightwave/Lightwave_r1.exe

You can get more information about (or purchase) Life Forms 3 from the publisher:

Credo Interactive Inc.
8900 Nelson Way
Burnaby, V5A 4W9
British Columbia, Canada
Tel: 1-604-291-6717
Fax: 1-604-291-7484
Website: www.credo-interactive.com
email: info@credo-interactive.com

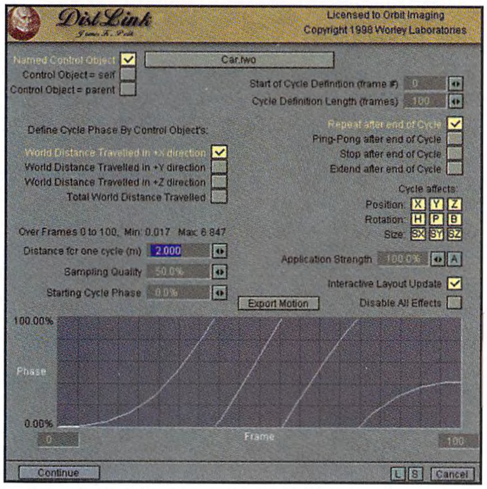
Polk Collection

Reviewed by Kevin Jackson

James K. Polk (JKP) is a collection of 23 plug-ins for LightWave created by Worley Laboratories. JKP requires LightWave version 5.0 or later. All the plug-ins are contained within one file called polk.p. Just copy this file into your Plug-ins\Layout subdirectory and add the plug-in in Layout.

The manual gives a very complete and thorough description of each plug-in. Also included are demo scenes demonstrating the use of the plug-ins. The well-written manual and the demo scenes will get you up to speed quickly.

JKP plug-ins fall into five categories: Motion, Displacement, Shader, Pixel, and Image. Many of the motion plug-ins are designed to help automate cycles of motion. These cycles can be controlled by a null or by the motion of



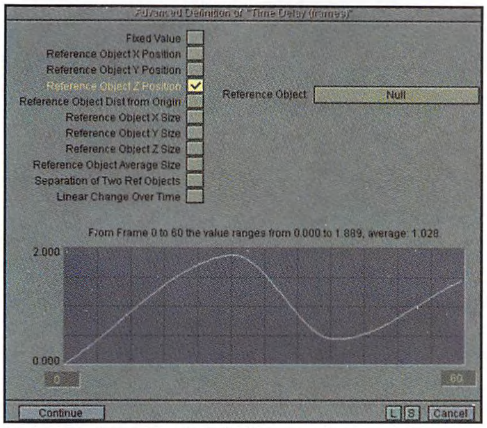
Named Control Object ☑ Car.lwo
Control Object = self ☐
Control Object = parent ☐
Start of Cycle Definition (frame #) 0
Cycle Definition Length (frames) 100
Define Cycle Phase By Control Object's:
World Distance Travelled in +X direction ☑
World Distance Travelled in +Y direction ☐
World Distance Travelled in +Z direction ☐
Total World Distance Travelled ☐
Repeat after end of Cycle ☑
Ping-Pong after end of Cycle ☐
Stop after end of Cycle ☐
Extend after end of Cycle ☐
Cycle affects:
Position: X Y Z
Rotation: H P B
Size: SX SY SZ
Over Frames 0 to 100, Min: 0.017 Max: 6.847
Distance for one cycle (m) 2.000
Sampling Quality 50.0%
Starting Cycle Phase 0.0%
Application Strength 100.0%
Interactive Layout Update ☑
Disable All Effects ☐

Figure 1: Distlink control panel.

another object. Four different link plug-ins give you this capability: PhaseLink, ThrottleLink, SpeedLink, and DistLink.

DISTLINK (Figure 1) controls a cycle based on the distance an object travels. This object can be itself or another object, light, bone, or camera. JKP uses its own excellent item picker that makes this selection a snap. An example of one use of this plug-in is a piston cycling up and down based on the distance a car moves. As the car speeds up, the piston cycles faster. As the car slows down, the piston moves more slowly.

WHEELIE (Figure 2) is a motion plug-in designed to animate wheels. Its simple interface makes setting up wheel motion a snap. Just select which axis the wheel is to rotate around and which axis of motion will control the wheel's rotation. Wheelie automatically calculates the motion of the car and rotates the wheel to keep it locked to the ground without sliding.



Fixed Value ☐
Reference Object X Position ☐
Reference Object Y Position ☐
Reference Object Z Position ☑
Reference Object Dist from Origin ☐
Reference Object X Size ☐
Reference Object Y Size ☐
Reference Object Z Size ☐
Reference Object Average Size ☐
Separation of Two Ref Objects ☐
Linear Change Over Time ☐
Reference Object Null
From Frame 0 to 60 the value ranges from 0.000 to 1.889, average: 1.028

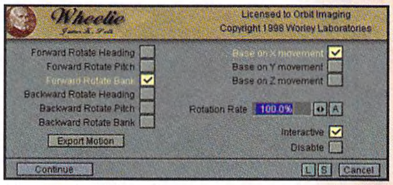
Figure 5: Advanced Definition control panel.

PARENT (Figure 3) has some features like Lock & Key. Parent enables the animator to dynamically parent objects, lights, bones, and camera frame-by-frame. You can parent a cup to a table on frames 1 to 50, then on frame 51 change the cup's parent to a hand that has come to grab it.

The Divorce Channels option is a very useful feature of this plug-in. With this feature you can parent, say, pedals to a bike wheel. As the wheel rotates, the Divorced rotation channels of the pedals keep them properly orientated to the ground (Figure 4).

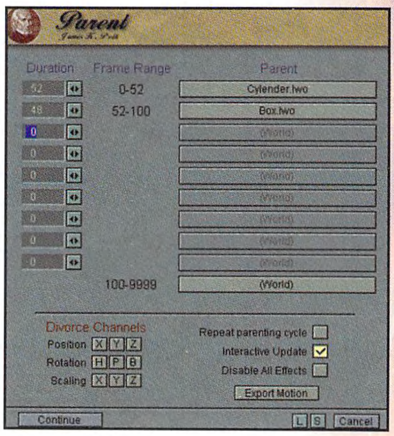
TRACK enables any object to track any other object, camera, bone, or light. You can use this to animate eyes that focus on a moving fly. You can also add a Time Delay so the eyes follow slightly behind the fly. One of my favorite features of JKP is its ability to control numeric requesters using null objects, Figure 5. This gives you great control over all parameters. For example, you could use a null to animate the Time Delay so the eyes catch up with and lag behind the fly's motion over time.

Briefly, here are the other motion plug-ins included in JKP. BLINK randomizes a cycle's speed and the length of pause between cycles. LIMITER constrains the motion, rotation, and scale of an object to preset limits. SPEEDLIMIT assigns a maximum speed for a given object. If you keyframe the object to move faster than its assigned speed, SpeedLimit will slow down the object so it no longer exceeds the assigned limit. WHIP calculates how an object will react with a given force applied to it. Using Whip in conjunction with the displacement plug-in Flexor, the animator can automate the flexibility of an insect's antenna. If the insect moves quickly forward, then stops abruptly, Whip simulates the effect of forward momentum and will cause the antenna to spring back and forth before resuming its natural position. You can even add gravity and wind friction to the simulation!



Forward Rotate Heading ☐
Forward Rotate Pitch ☐
Forward Rotate Bank ☑
Backward Rotate Heading ☐
Backward Rotate Pitch ☐
Backward Rotate Bank ☐
Base on X movement ☑
Base on Y movement ☐
Base on Z movement ☐
Rotation Rate 100.0%
Interactive ☑
Disable ☐

Figure 2: Wheelie control panel.



Duration	Frame Range	Parent
52	0-52	Cylender.lwo
48	52-100	Box.lwo
0		(World)
0		(World)
0		(World)
0		(World)
0		(World)
0		(World)
0		(World)
	100-9999	(World)

Divorce Channels
Position X Y Z
Rotation H P B
Scaling X Y Z
Repeat parenting cycle ☐
Interactive Update ☑
Disable All Effects ☐

Figure 3: Parent control panel.

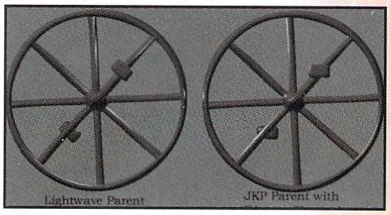
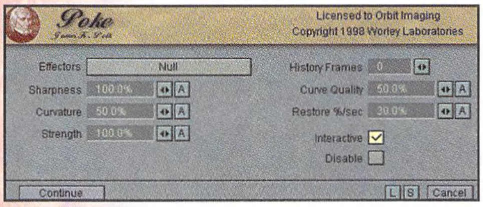


Figure 4: Ordinary parenting (left) and Divorced rotation channels (right) affect bicycle pedals.

The four displacement plug-ins included in JKP are: Dangle, Diffuse, Flexor, and Poke.

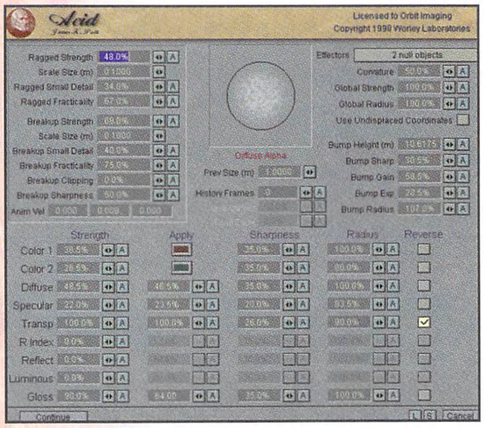
DANGLE simulates how a chain would react when attached to two objects. The chain object's position is one anchor, a null or object the other. Dangle automatically calculates the hanging shape of the chain based upon the distance between the two anchors. As one or both anchors animate closer to one another, the chain will slacken and droop. As the anchors move away from each other, the chain will straighten.

DIFFUSE is a particle system effect that adds a random gas diffusion to a large group of single point polygons. This works great with Steamer to simulate vapor that slowly dissipates.


Poke
James K. Polk
Licensed to Orbit Imaging
Copyright 1998 Worley Laboratories
Continue
L
S
Cancel

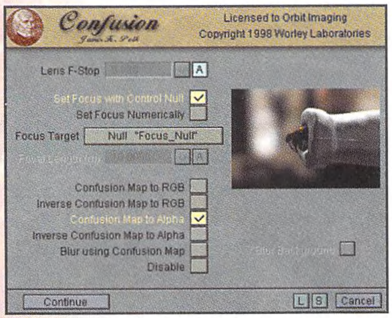
Effectors: Null
Sharpness: 100.0%
Curvature: 50.0%
Strength: 100.0%
History Frames: 0
Curve Quality: 50.0%
Restore %/sec: 30.0%
Interactive ☑
Disable ☐

Figure 6: Poke control panel.


Acid
James K. Polk
Licensed to Orbit Imaging
Copyright 1998 Worley Laboratories
Scale Size (m)
Ragged Small Detail
Ragged Fracticality
Breakup Strength
Scale Size (m)
Breakup Small Detail
Breakup Fracticality
Breakup Clipping
Breakup Sharpness
Anim Vel
Diffuse Alpha
Prev Size (m)
History Frames
Curvature
Global Strength
Global Radius
Use Undisplaced Coordinates
Bump Height (m)
Bump Sharp
Bump Gain
Bump Exp
Bump Radius
Strength
Apply
Sharpness
Radius
Reverse
Color 1
Color 2
Diffuse
Specular
Transp
R Index
Reflect
Luminous
Gloss
Continue
L
S
Cancel

Ragged Strength: 48.0%
Effectors: 2 null objects

Figure 7: Acid control panel.


Confusion
James K. Polk
Licensed to Orbit Imaging
Copyright 1998 Worley Laboratories
Continue
L
S
Cancel

Lens F-Stop
Set Focus with Control Null ☑
Set Focus Numerically ☐
Focus Target: Null "Focus_Null"
Confusion Map to RGB ☐
Inverse Confusion Map to RGB ☐
Confusion Map to Alpha ☑
Inverse Confusion Map to Alpha ☐
Blur using Confusion Map ☐
Disable ☐

Figure 8: Confusion control panel.

FLEXOR bends objects based on the motion of another object or null. As mentioned above, Flexor used with Whip can be used to generate realistic bending motion without having to keyframe an IK bone chain.

POKE (Figure 6) is a great plug-in for animating all kinds of indentation effects. Poke works with one or more effectors. Imagine an animation where a blacksmith is hammering on a glowing hot iron bar. With an effector parented to the hammer, apply Poke to the iron bar. As the hammer strikes, the effector leaves dents in the bar. Poke also has a Restore control that allows the object's shape to reform over time.

The two shader plug-ins included in JKP are Acid and HSVBoost. ACID (Figure 7) is a dynamic texture generator that is one of my favorites in the collection. Acid creates irregular splotches of texture or transparency that you can position on geometry with a control object. Acid gives you control of two color channels, plus diffuse, specular, transparency, reflection, luminous, gloss and bump. Using the transparency channel of Acid creates an irregular hole that you can animate by the movement and scaling of a control object. This can create the effects of acid burning a ragged hole in a plate of steel or holy water dissolving the flesh off a vampire.

HSVBOOST enables you to boost, reduce, or shift the surface color's hue, saturation, or value. This plug-in also gives you the added control of changing the hue, saturation, and brightness based on the angle of the object to the camera.

JKP contains two pixel plug-ins, Enviro and Vfog. ENVIRO creates a full 360-degree map of the entire scene from a central viewpoint. You can use this for environment reflection maps or QuickTime VR movies. VFOG is a simple fog generator that composites the fog effect onto the rendered image. It gives good results, but has some limitations: the fog won't show up in reflections and it won't be visible behind transparent objects.

JKP also contains three image plug-ins: Confusion, DropShadow, and Lens. CONFUSION (Figure 8), a depth of field tool, is another one of my favorites in this collection. You can use a null or a fixed coordinate as a focal point. The advantage of using a null is that you can animate it to simulate a rack focus. You can also animate the lens f-stop. Confusion can blur the image directly or create a gray-level image to be saved out through the RGB or Alpha saver. This gray-level image corresponds to the amount of blur to be applied to the image. You can use this image sequence as a bitmap mask blur in a compositing program. I have used this technique with great results using Digital Fusion as the compositing program.

DROPSHADOW creates a simple and fast dropshadow effect. It uses the Alpha channel to lay in an offset, blurred, darkened shadow onto the background.

LENS compensates for background footage that was shot with most lens distortions, for example, as you would see with wide-angle lenses. Lens can also un-distort the background image to make it flat. Conversely, you can use Lens to distort LightWave's imagery to match the background footage.

With this many plug-ins in one package, there's really something here for everyone. The plug-in effects render at a reasonable speed and the output is of professional quality. I've used the JKP plug-ins on the Alpha and Intel platforms and rendered on ScreamerNet without any problems. This collection is also priced very reasonably. Worley Labs even throws in ten bonus plug-ins!

In the next issue of Keyframe, I'll show how I used the JKP, Bones, Inverse Kinematics, and DarkTree Textures to make a flea circus come to life. (Figure 9)

Kevin Jackson can be reached at orbit@orbitimaging.com.

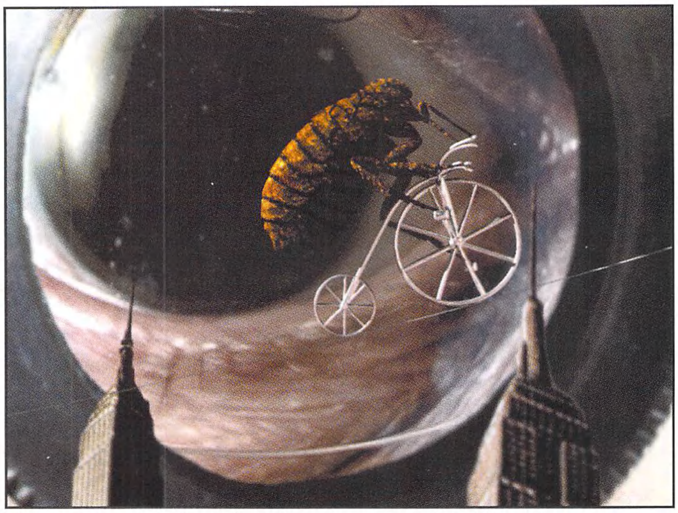


Figure 9: Coming Attraction! Creating an animated flea circus.

Take One

by Lee Stranahan, with David Hibsher

Obviously, most of the work in computer animation is done at the computer. (duh) However, by the time a shot lands on your CPU, it has traveled the long road of concept, script, budgeting, production, transfer, and editing. In this column, I want to try to take you from behind your computer and onto the set on real productions.

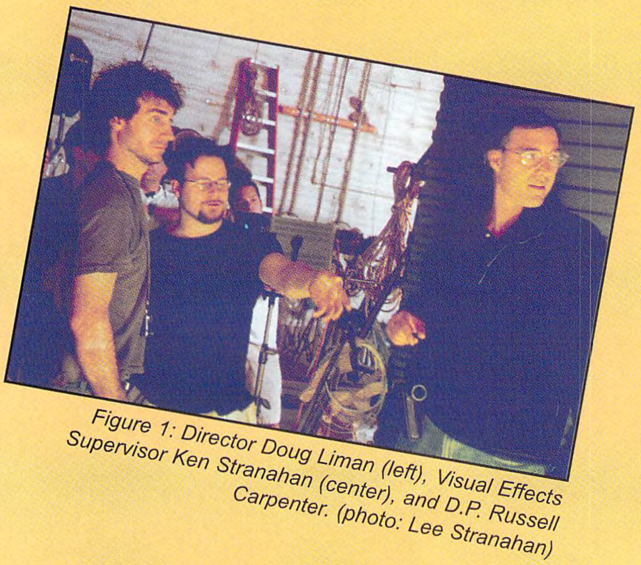


Figure 1: Director Doug Liman (left), Visual Effects Supervisor Ken Stranahan (center), and D.P. Russell Carpenter. (photo: Lee Stranahan)

This month, we will go behind the scenes of a project that I worked on, a commercial for an Italian watch called the Sector Expander. Propaganda, a top Los Angeles/New York commercial and music video production company, produced the project. The visual effects supervisor on the project was my brother, Ken Stranahan. Ken has a great resume, including work on TV shows such as *Star Trek: The Next Generation, Space: Above And Beyond*, and *Sliders*.

The commercial was only going to be shown in Europe, but Propaganda producer Suzanne Preissler had put together a top-notch crew. Doug Liman was the director. He had previously worked with both Ken and Suzanne on a commercial for Airwalk shoes. Liman had made a splash with the Miramax low budget indie comedy *Swingers*. On that film, Liman acted as both Director and Director of Photography. In fact, for much of the film Liman was the camera operator as well.

For this shoot, Liman had a solid and experienced cinematographer. Carpenter had been behind the camera on *True Lies, Lawnmower Man*, and a little film you may have heard of, *Titanic*. While neither Ken nor I had worked on *Titanic*, we had had a chance to visit the *Titanic* set in Mexico on one of the last nights of shooting. The complexity of that shoot was truly amazing. At the time of shooting the Sector Expander commercial, Carpenter had not yet won his Oscar for *Titanic* but he sure seemed like a safe bet. Ken jumped at the chance to work with him.

Commercials, like music videos, are often shot based on a treatment rather than a script. A treatment is usually a one- or two-page description of how the production will look. Instead of the formal formatting of a script, a treatment is written in prose form. The treatment for the Sector Expander spot read more like a miniature film than a spot to hawk watches; it was a one-minute sci-fi movie. (Commercials are often longer in Europe, although 30- and 15-second versions were also edited.)

The spot opens with the hitchhiking hero standing on an asteroid. A spaceship picks him up. The ship is full of pods, and each pod contains a species captured by the Alien Girl who owns the ship. The hero is trapped, but manages to break free, turns the tables on the Alien Girl by trapping her, and frees the other trapped aliens. Doesn't that make you want to buy a watch?

Ken hired an outside artist to design the aliens. Ken had to do this early in the production process, because some physical models of the aliens needed to be built for dressing the set. Also, the long process of modeling the aliens in LightWave and prepping them for animation (by adding bone structure, control handles, et cetera) had to happen as early as possible. There were five different aliens, each of which had to look completely different from the other species, Figures 2a and 2b.

One advantage for Ken in hiring the artist to design the aliens is that the copyright ownership of the aliens went to Ken, not the production company. In other words, Ken paid for the design work and his contract allowed him to hold onto the rights to the designs. This is a good strategy because it enables the animator/effects supervisor to build up a catalog of objects. If Ken got a job on a sci-fi TV show that called for aliens, he has a little alien cast to choose from. This can save tremendous amounts of time and money in the long term for an animation business.

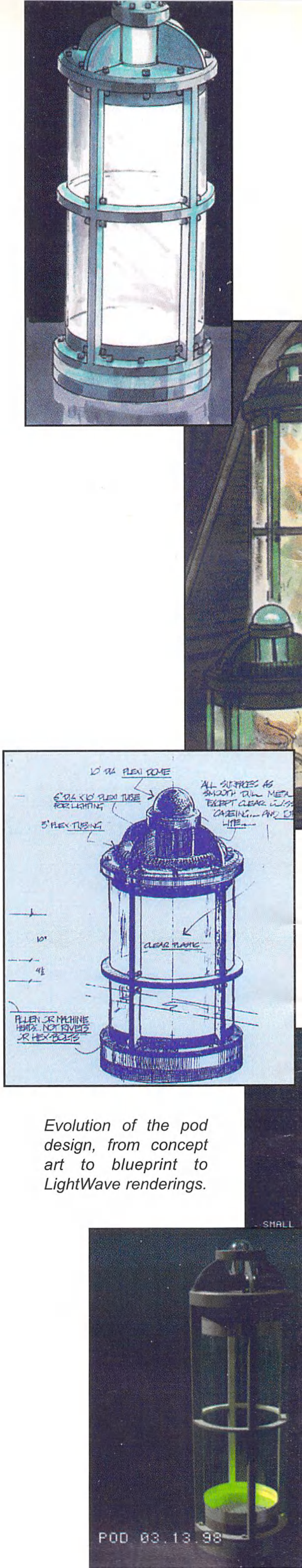
The two-day shoot was scheduled on a lot at Universal Studios in Universal City, California. There were a number of meetings to plan the shoot, which was complicated by the fact that the clients were in Europe. The design team created sketches for the set and creatures. I set up a web site that was used for client approvals, but time and distance still caused a number of minor communication problems.

Ken and his team were involved from early on in pre-production. This helped a lot, because the commercial was incredibly effects-heavy. Almost every shot had some sort of visual effect. With Ken's team being involved early, they were able to catch a lot of problems in time. Unfortunately, in production there are always things that take you by surprise.

The treatment called for one of the pods to drop down on the commercial's hero, capturing him. Originally, this was supposed to be done as a practical effect rather than using LightWave. Once the pods were built, it was obvious that the practical effect would not be possible. The pods were very very heavy, and the idea of actually dropping one even a few feet brought visions of blood and gore effects not called for in the script (or covered by insurance).

There were always plans to build LightWave versions of the pods to extend the set. It was cheaper to make the set appear larger through computer generated imagery (CGI) than to rent a bigger stage, build a bigger set, and make more props. Animator David Hibsher was on set with Ken to take a look at the pods and make notes for building the pods in LightWave. These notes included Hi-8 videotaping of the pods. The LightWave version of the pods also had to be built in sections so they could telescope as they rose or dropped, rather than simply rising or falling as a single, rigid object. This effect would have been difficult, expensive or impossible with a practical model.

For the set extension, Ken and David also made video notes of other parts of the set, especially the inside of the alien space-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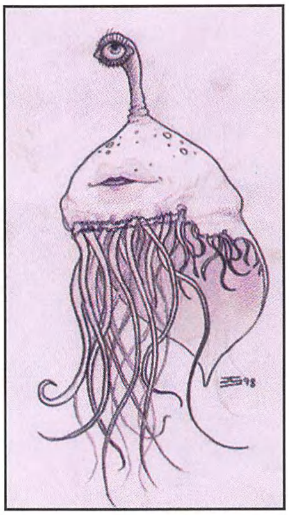
Evolution of the pod design, from concept art to blueprint to LightWave renderings.



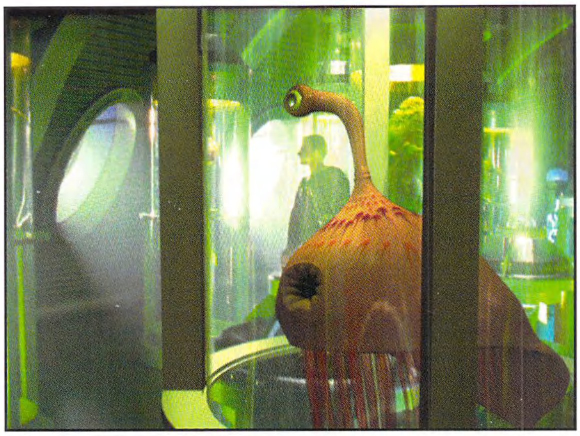
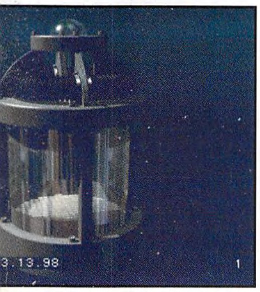


Figure 2a above: Finished shot

Figure 2b to left: Alien design sketch craft including the wall beams and windows. Another advantage to making videotaped notes is that they better capture the effects of lighting and fog than mere written notes can. These effects are vital to doing an effective set extension.

One place where written notes are a must, however, is in recording the camera data and motion. Several shots in this commercial called for live action to be composited with CGI. The LightWave camera must exactly mimic the attributes of the real camera to make the computer-generated parts appear to be on the set. The necessary camera data included: the lens size, the height of the camera from the set floor, and the angle of the camera to the floor. The effects team recorded this data for every take of every shot, creating a pages-long list.

The effects team must also carefully record the motion of the camera. If LightWave's camera does not faithfully reproduce the on-set camera moves, the composited objects will appear to slide around during the shot. Even slight mistakes can stick out like a sore thumb and can ruin the believability of the composite.



One particularly difficult shot called for the camera to dolly through the set while panning around a CGI pod that was composited in later. A C-Stand placed on the set gave the camera operator a target during the move. This stand had to be digitally removed later. The beginning and ending camera positions had to be carefully calculated by triangulating from several reference points on the set. The position of the CGI pod also had to be calculated. The distance of the camera move and the best guess of the move's time had to be recorded, again for each take.

Even with all the right data, matching camera moves in LightWave is tedious work. The frames from the selected take are digitized, and the animator loads them as a LightWave Layout background. The animator then blocks out the basic camera movement according to the recorded camera data and calculations. The animator positions the CGI objects as if they had been on the set. Now the animator tests the first pass of the motion. Typically, the 3D objects slide around, and the animator tries to figure out which way to adjust the camera movement to improve the illusion. The animator repeats this process until the illusion is perfected, or at least close enough to be believable within the time available for that shot.

The Alien Girl's appearance was another problem. Rather than use makeup, the director decided it would be better to give her a negative image appearance digitally in postproduction. At first this sounded smart; however, since it was impossible to isolate the Alien Girl from the background, this approach meant hours and hours of rotoscoping work to draw the necessary matte. Since there was no way to automate the process, one of the effects team had to draw mattes every frame or two in Digital Fusion. This is referred to as hand roto work: the labor-intensive process of fixing something frame-by-frame.

This change also added to the overall complexity of the project's organization, since it meant that a separate pass would be required to run effects on the Alien Girl. Here is the way it was going to break down. Let's say there was going to be a shot where you could see out the windows of the spaceship, see the Alien Girl, and there was a moving pod. This shot would require at least three passes - one green screen keying pass to put the star field outside the window, one hand roto pass to fix the Girl, and one pass in LightWave to add and animate the pod.

You can avoid some of these problems by very careful pre-production. However, this shoot proved that even with experienced producers, directors, and crews, changes can and do sometimes happen at the last minute. Why? Because production days are limited, since they are very expensive. Pre-production allows you to solve some problems before they occur, but some problems don't rear their ugly little heads until you actually see the actors and props on a lit set. The ability to roll with the punches is an important job skill for anyone in this business. Anyone can pass blame around, but if you want to work in this industry, you need to be the kind of person who can solve problems.

Figure 4: VFX supervisor Ken Stranahan (left) and animator David Hibsher (photo: Lee Stranahan).

Lee Stranahan is a filmmaker, photographer, visual effects artist and teacher who has taught thousands of people how to get more out of LightWave through seminars, videos and CDs. He lives in Pasadena, CA. www.stranahan.com

David Hibsher (www.netcom.com/~dhibsher/) is a freelance animator in West Hollywood, CA who has worked on Star Trek: Deep Space Nine, Conan: The Adventurer, Airwalk commercials, and other TV projects. As a technical writer and instructor for NewTek, he contributed to the LightWave 4.0 and 5.0 documentation.

FINAL CUT

by Rob Nederhorst

Since we last met on these pages, I have gone out and about to see what people want to read in this column. I went onto the Internet and polled some folks and found that people wanted to know what life is like at a large effects facility such as Digital Domain.

There are a few common misconceptions about the work environment at a large shop. The first is that we are only a number in a big bowl of number soup. That is very untrue. Since the day I got to Digital Domain, I have never felt like a number, and I don't think I will in the future either. I have heard the same rumor about other large effects houses, so I asked someone I know in a pretty large place. He said that everybody there was definitely not treated in that way. Fantastic! The other generalization that I hear a lot is that the big facilities segment you off to do only one thing. That's not true either. We do all kinds of stuff. I will be modeling for a while, then switch over to color/lighting and also some texturing. I have done animation and even some compositing , so that basically rounds out everything in the cycle.

I say we do everything, but there are some occasions in which we don't do it all. We don't generally have to pull mattes. We have talented rotoscope artists to do that. For big features, we usually don't do our own compositing. The digital artist works with a team of compositors to get the shot looking killer. In some of the smaller shops you really do have to do everything. That's great, because you learn the process. However, it's bad because you spend time working on something that isn't your forté, so it takes you longer to get it done. That means less time to get your real work done. It's a vicious cycle, I tell ya!

So what is an average day is like in the life of an artist at Digital Domain? There are two parts of DA (digital artist) life: the film realm and the commercial realm. If you are on a commercial spot, you are generally expected to be in around 9 AM. One day out of the week there will be a meeting of all the DAs and the visual effects supervisor to discuss details of the job and related issues. Generally, a Producer and a Production Assistant are present. It's the Producer's job to handle most of the contacts with the client. It's a wonderful thing to have the producer handle that side of the job! The PA's task is to help the Producer and the artists get their jobs done. It doesn't sound like a really glamorous job, but let me tell you, without our awesome PAs our life would be hell. That's not to say that the Producer has nothing to do with the artists. In fact, the Producers try to keep us happy and having a good time on their spot so we will do better work. I haven't worked with a Producer yet at Digital Domain that I haven't liked.

Here are some observations I have made about working on commercials since I have been throwing pixels around at Digital Domain . You get to interact with lots of different people in the facility. Yes, Digital Domain is a big place, and there are lots of people working here, so it's always good to meet more of your fellow artists in the trenches. The other good thing is actually a two-edged sword. It's great that commercials have a shorter time frame than films, because you are not on one shot for weeks, but many shots in that same time. This keeps you fresh and forces you to work faster. The thing that makes commercials the challenge they are is that you are still expected to do the same caliber of work as you would for a film, but in a shortened time span.

On the film side, the worker bees buzz in around 8:30am and sit down for dailies. Oof. Yes, it is tough to make it in at 8:30. This is when the Visual Effects Supervisor will comment on the previous day's work, and let the artists know where to take the shots they are working on. After dailies, it's usually off to the Firehouse for a large breakfast so we can charge up for a day's work. Then it's time to check your renders from the previous night and show them to the VFX Supervisor when he/she comes by for walk-thrus. Walkthrus happen at the beginning of the day and towards the end of the day. This is a chance for the VFX Sup to see anything that was not in dailies but should be brought to their attention.

There are more people involved in the process of the film, as you might expect. There are walkthru coordinators whose job it is to make sure the VFX Sup sees the people that have stuff to show. They also take notes on what's said between the artists and the VFX Sup, then get those notes out to everyone via email. This way we all know where we stand on our shots and have a nice record of what to do.

The Production Coordinators make sure everyone renders on the specified CPUs for the day. They also make sure the artists get what they need, and put us in touch with the people and information that we need. Without them, we might as well throw in the towel.

The great thing about film work can be summed up in three words: resolution, resolution, and resolution. Commercials deliver at 720x486, which is D1 resolution. In film you work at much higher resolutions. Right now we are working at 2048x1556. Resolution is your friend, because all the detail you lose when you work at D1 you gain (and so much more) when you work at film res. The flip side is that you have to make everything look as good as humanly possible, because film doesn't lie. It's all worth it in the end because you get to see the work on a big screen. I will let you know how that feels after we deliver Supernova.

Well, that about sums it up. There are more pieces to the process, but this column is only so big and there are other topics to be covered as well. In the future, I'll be writing this column for a higher, more professional level. I am not saying that it will be only for professionals, but I won't be covering any basics on these pages. I am going to work on a surfacing tutorial/demo that I hope will teach some of the old dogs new tricks. I am sure there are many other things on your mind. Please send your suggestions to the Editor at dakelly@earthlink.net. He will get the best ideas to me, and we will get you the articles you want to read. Until next time, everyone--party on!

Robert Nederhorst is a digital artist at Digital Domain, Venice, CA. You can email him at throb@d2.com.

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Particle Fields***: Puts an attraction or repulsion radius around each particle, allowing them to flow together or avoid each other. Used with HyperVoxels, you can get realistic ooze and water effects. Used with object replacement or Sub-Objects, your particles won't go through each other. (Figure 1)

Hair***: This first of two new emitter types allows you to create responsive hair, string, streamers, etc. (Figure 2)

Spawner***: The second new emitter type turns particles into emitters upon collision, or reaching a certain age or speed. Great for fireworks and waterfalls!

Sub-Objects and **Sub-Polys**: View your particles as LW objects or shapes right in the PS2 interface! (Figure 4)

Mimic***: Particles can follow the path of an object in Layout or envelope, and change their size and orientation.

Assembler***: Assemble objects or shapes out of particles or their polygons. (Figure 3)

Envelopes: Now envelope almost every parameter.

Layout Integration: Use Layout items to control particle parameters right in Layout.

Sticky Particles: Particles can stick to collision objects, allowing spray-painting effects.

Bounding Shapes: All controllers can use bounding shapes to specify areas of influence.

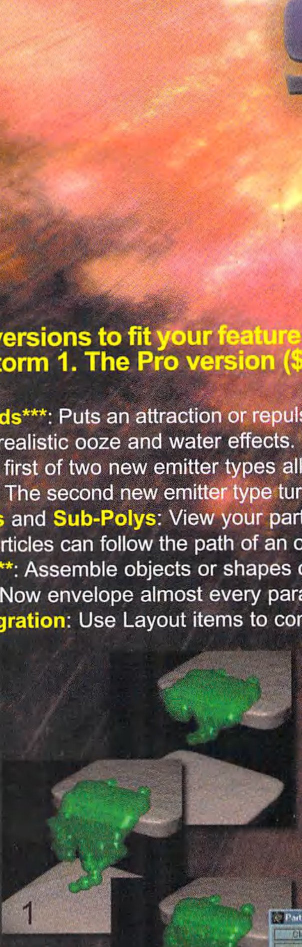
Collision Detection: Use LW objects, boxes, or ellipses. Now particles can also see ahead to avoid collisions.

OpenGL Realtime Preview: The resizable window has drop-down menus and a new tree-control interface. Camera movements have keyboard shortcuts, and many actions are performed with the right mouse button.

Gravity, Wind, Flocking & Swarming, Drag, Force Fields, Death Wish: They're all still there, now with Bounding Shapes, Envelopes, and parenting to Layout reference items.

Particle Shader: Enhanced with separate keyframes for color and Alpha channels.

Parenting: Control each individual channel with Envelopes or Layout reference items.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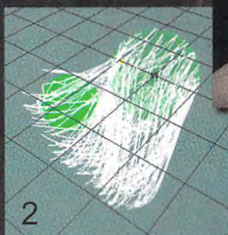
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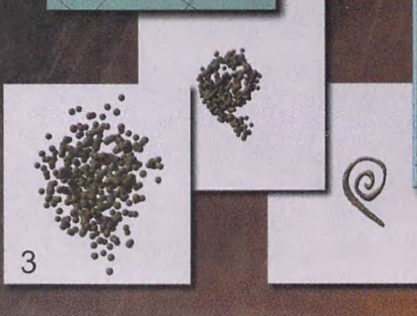
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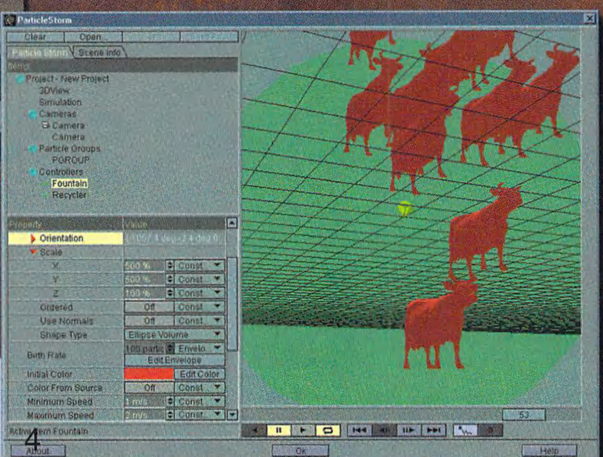
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ParticleStorm
Clear
Open
Particle Storm
Scene Info
Project - New Project
3DView
Simulation
Cameras
Camera
Camera
Particle Groups
PGROUP
Controllers
Fountain
Recycler
Property
Value
Orientation
Scale
X
Y
Z
Ordered
Use Normals
Shape Type
Birth Rate
Initial Color
Color From Source
Minimum Speed
Maximum Speed
Ellipse Volume
Edit Envelope
Edit Color
Const
Off
About
Ok
Help

1) Particle Fields and Hypervoxels 2) Hair reacting to a Collision object. 3) Assembler creating the LW logo out of Hypervoxels. 4) The intuitive new OpenGL interface. Particles are emitting as cows using the Sub-Objects feature! 5) Background image created with PS2 and HyperVoxels 2.0.

*PS2 Jr. available for LightWave 5.5+ (has PS Lite) and Inspire 3D for Intel and Macintosh for $295. Does not include Hair, Assembler, Particle Field, Mimic, and Spawner.

**PS2 Pro available for LightWave 5.5+ (has PS Lite) for Intel, Macintosh, and Alpha for $495 ($595 after 12-31-98). Available for SGI for $895. Upgrade from Particle Storm 1.x for $295 ($350 after 12-31-98), to registered owners only.

***These features are only included with the Pro version.

Prices good thru 1-31-99.

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